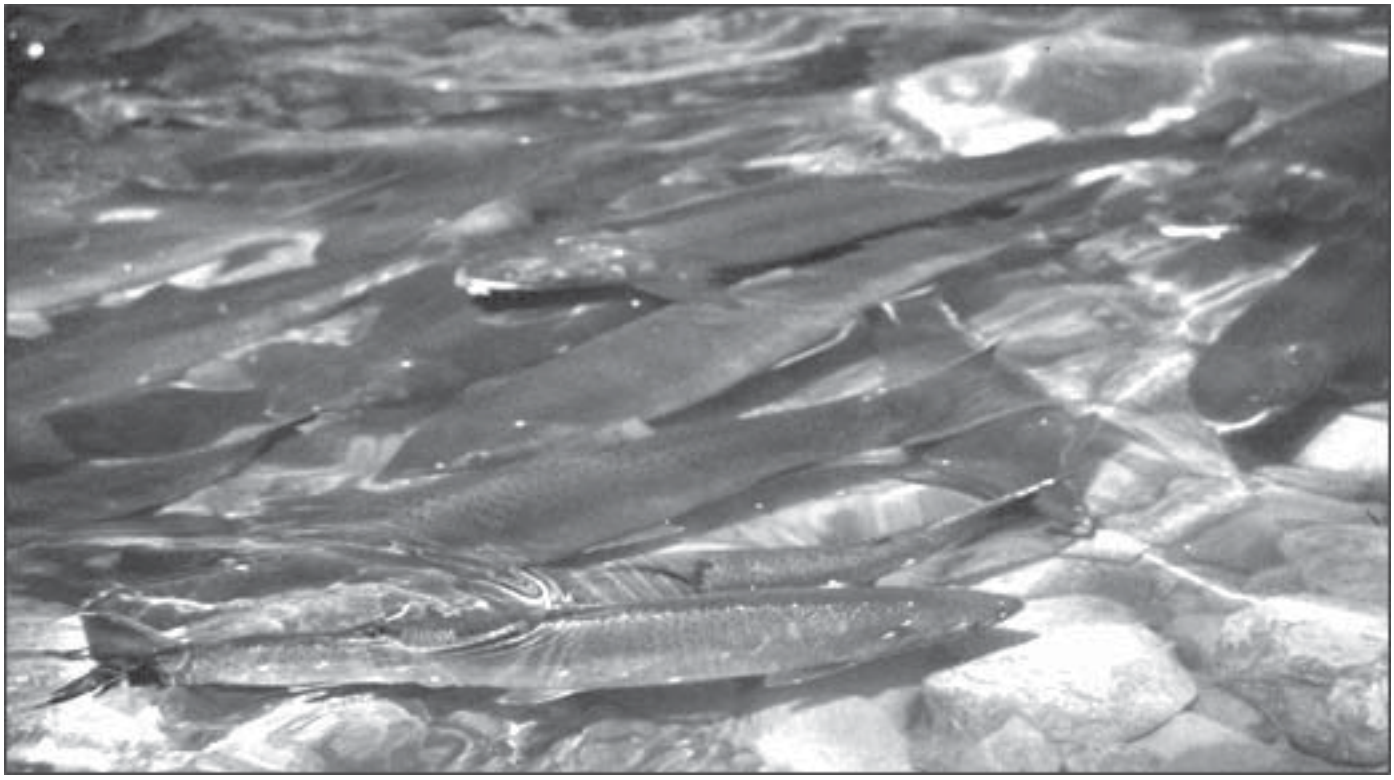
# *Endangered Species Act 2004/2004–2008 Implementation Plan for the Federal Columbia River Power System*



US Army Corps of Engineers

BONNEVILLE POWER ADMINISTRATION

*November 2003*

# Contents

## List of Figures



## List of Tables

# 1.0 Overview of the 2004/2004–2008 Implementation Plan

## Background

The National Marine Fisheries Service (NOAA Fisheries)[1] and the U.S. Fish and Wildlife Service (USFWS) issued Biological Opinions (BiOps) in December 2000 for the operation and maintenance of the Federal Columbia River Power System (FCRPS). This complex of dams and reservoirs is operated by the U.S. Army Corps of Engineers (Corps), the U.S. Bureau of Reclamation (Reclamation) and the Bonneville Power Administration (BPA), referred to collectively as the Action Agencies. The BiOps examine effects of FCRPS operation on threatened and endangered fish in the Columbia River Basin and prescribe actions to be taken by the Action Agencies to avoid jeopardy to these Evolutionarily Significant Units (ESU) of fish.

The BiOps guide implementation of measures by the Action Agencies to protect and further the recovery of Endangered Species Act (ESA) listed Columbia River basin salmon, steelhead and bull trout, and Kootenai River white sturgeon (See Table 1-1 for a list of these species). They provide a flexible framework of performance standards for the FCRPS and other conservation measures over the 10-year period from 2000 to 2010.

**Table 1-1. Fish identified as Evolutionarily Significant Units (ESUs) that are threatened or endangered throughout the Columbia River Basin.**

| **Anadromous Fish ESUs** (* jeopardized) | |
|---|---|
| Chinook salmon | • Snake River spring/summer*<br>• Snake River fall*<br>• Upper Columbia River spring*<br>• Upper Willamette River<br>• Lower Columbia River |
| Steelhead | • Snake River*<br>• Upper Columbia River*<br>• Mid Columbia River*<br>• Lower Columbia River<br>• Upper Willamette River |
| Chum salmon | • Columbia River* |
| Sockeye salmon | • Snake River* |
| **Resident Fish Species** | |
| Bull trout | • Columbia basin Distinct Population Segment |
| White sturgeon | • Kootenai River |

### *NOAA Fisheries BiOp sets "check-ins" for 2003, 2005 and 2008*

NOAA Fisheries specified mid-point evaluations, or "check-ins," for 2003, 2005, and 2008. The *2003 Check-In Report* was released in September 2003 and primarily looked at progress made towards obtaining funding, initiating studies, developing performance standards and other programmatic issues. It also provided updates to adult fish returns, abundance and abundance trends, and juvenile fish survival. In the *2003 Check-In Report,* the Action Agencies concluded that overall implementation of the NOAA Fisheries BiOp was on track. The Action Agencies also acknowledged that some problems had occurred, but most were delays rather than inaction. Delays occurred because of funding difficulties, time required for appropriate levels of environmental review, and the necessity for a higher level of regional coordination than anticipated by the BiOp.

With this *2004/2004–2008 Implementation Plan,* the Action Agencies identify shifts that we believe are appropriate to achieve the performance-based goals of the BiOp. The 2005 and 2008 check-ins will focus on the assessments of biological results of program implementation, including population growth rates, abundance and other biological factors.

Implementation plans are called for under the BiOps and provide the conceptual foundation and the management framework for coordinating actions to further recovery. These plans are intended to inform and be informed by, other ongoing state, tribal and regional planning efforts, such as the Northwest Power and Conservation Council's (Council) Fish and Wildlife Program.

This *2004/2004–2008 Implementation Plan* is the third issued by the Action Agencies and builds on the lessons from our first three years of BiOp planning and implementation.

[1] NOAA Fisheries is the new official name for the former National Marine Fisheries Service. In the remainder of this document, we will refer to them as NOAA Fisheries.

# Implementation Plan Framework

The Action Agencies are again issuing this year's one- and five-year implementation plans as a single combined document. This plan presents a disciplined, structured approach designed to ensure clear direction, effective use of Action Agency resources, accountability for results and adaptive management over time as implementation of actions and studies yields new information about performance and resolution of current uncertainties. The plan focuses on meeting the biological requirements of listed fish, guided by the structure illustrated in Figure 1-1 and described in this section.

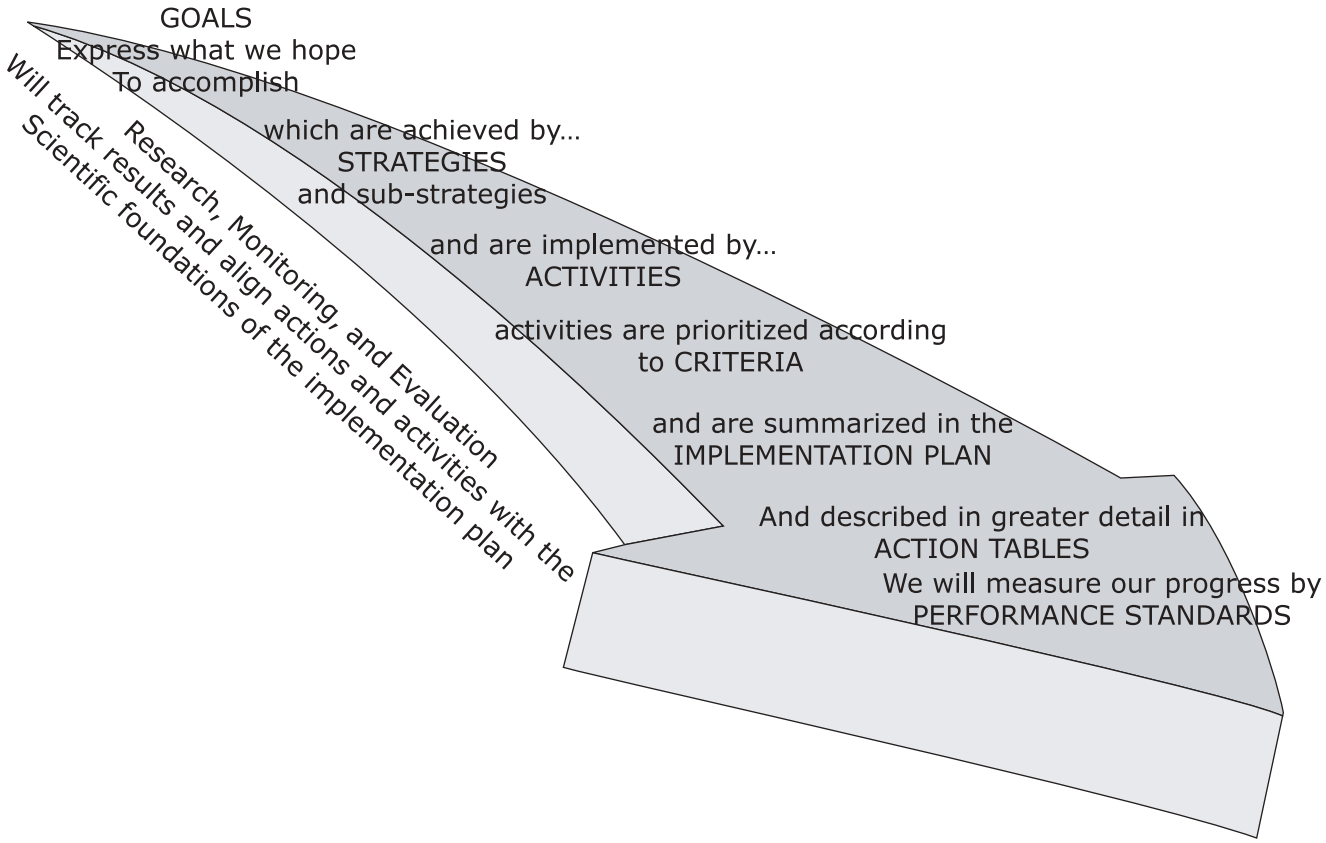



*Figure 1-1. Action Agencies BiOp Implementation Framework.*

**Goals:** The plan's goals are a summary of what the Action Agencies want to accomplish, working in concert with other recovery efforts in the Columbia Basin. The goals are based on various legal obligations, the goals described in various other regional plans and the performance standards and/or recovery goals envisioned by the NOAA Fisheries and USFWS BiOps.

**Strategies:** Strategies explain how the Action Agencies propose to achieve goals and performance standards. The overall strategy relies on a life cycle, or **All-H Approach.** The plan also describes strategies for each H category—**Hydrosystem** Improvements, **Habitat** Protection and Enhancement, **Hatchery** and **Harvest** Reforms—as well as strategies for **Resident Fish** and **Research, Monitoring and Evaluation** (RM&E). Over time, as new information becomes available, strategies specific to each ESU are likely to be developed and incorporated into the implementation plans.

**Priorities:** Within strategies, priorities and outcomes are identified for the next five-year period. There are more than 200 actions called for in the NOAA Fisheries and USFWS BiOps. From a practical standpoint, it is not possible to describe fully all of the actions that will occur within the next five years. Many of these actions have an implementation timeline of 10 or more years, exceeding the duration of this implementation plan and also the BiOps. In addition, as new information becomes available, actions may change and new actions may be implemented in response to adaptive management decisions. Consequently, those actions are not fully definable within the five-year implementation plan timeframe. Nevertheless, we are able to more specifically describe the actions for 2004 and generally describe actions for 2005–2008, especially those relevant to the 2005 check-in.

**Performance Standards:** Implementation Plan goals are linked to performance standards for salmon and steelhead, which are indicators of success at several levels. Assessments of population targets derived from the NOAA Fisheries BiOp help define the **Population Level** (Tier 1) **Performance Standards,** which are the responsibility of many parties in the region, not merely the FCRPS and Action Agencies. The NOAA Fisheries BiOp also helps to define the **Life-Stage Specific** (Tier 2) **Performance Standards** necessary to achieve the population level standards, dividing them into hydrosystem survival standards and a composite of other survival needs. **H-specific** or **Physical** (Tier 3) **Performance Standards** describe improvements in biological and environmental conditions. And finally, **Programmatic** (Tier 4) **Performance Standards** are tracked to see if the deliverables identified in the project level detail (Appendix A) are met. Proposed adjustments to performance standards, as anticipated by the NOAA Fisheries BiOp, are described in this plan.

# Structure of the 2004/2004–2008 Plan

This plan is similar to last year's implementation plans in that the five- and one-year plans have been combined into a single document. This allows a better understanding of the interrelationship of the two plans, particularly, how the five-year plan provides a broader context for the one-year plan. Construction projects and research studies which span several years, for example, may only be discussed piecemeal in the one-year plan, whereas the five-year plan shows how the year-to-year pieces fit together to produce a cohesive, future outcome (*e.g.,* dam improvement or finalized study).

Additionally, this it also summarizes general shifts due to new or revised information revealed in the *2003 Check-In Report.* These shifts are consistent with the adaptive management approach envisioned in the NOAA Fisheries BiOp.

The following is an overview of sections included in this document:

**Section 1.0–Overview**

Describes the context for the Action Agencies' five- and one-year implementation plans, the structure of this year's document and a summary of shifts from prior implementation plans.

**Section 2.0–Goals**

Identifies the goals derived from the "All-H Strategy" and evaluated using established performance standards.

**Section 3.0–Performance Measures and Standards**

Describes the performance standards and measures, or metrics, that will be used to determine success of implementation actions. Proposed changes to the performance standards and measures are also explained.

**Section 4.0–Strategies to Achieve Recovery**

Describes the Action Agencies' strategic approach for coordinating and implementing fish recovery efforts over the life of the BiOps.

**Section 5.0–Priorities, Work Plans and Outcomes (2004–2008)**

Details the Action Agencies five-year outcomes and one- and five-year work plans for BiOp implementation. The five-year portion serves as a "big picture" blueprint that organizes collective efforts by the three Action Agencies to achieve certain outcomes by 2008. The one-year portion provides a more detailed description of implementation measures planned for the upcoming fiscal year (October 2003 to September 2004). The work plans describe the specific tasks that need to be accomplished to achieve the identified outcomes.

**Section 6.0–Coordination Forums**

Describes the regional forums and other entities with which the Action Agencies coordinate fish recovery measures.

**Appendix A–Project Tables (separate document)**

Lists of specific projects the Action Agencies propose to implement from 2004 to 2008, based on the listed ESUs and H-categories, respectively. New and ongoing actions planned for implementation by the Action Agencies are included. Further project level detail is available to NOAA Fisheries and USFWS on request.

As expected, the implementation plans are dynamic and will continually evolve as information and experience advance. Each year, new implementation plans and a progress report will be issued and will inform NOAA Fisheries' annual Findings Letter. Each year, the plans will be further refined as progress and results are reported. Future updates to the plans will reflect new information, including recommendations from the fish recovery planning processes or input received through the regional coordinating forums.

# Public Comments

In past years the Action Agencies released draft implementation plans and asked for input from states, tribes and others. We would then attempt to adjust the final plans as appropriate. However, many commenters asked to provide

input prior to development of a draft so that they could better shape the outcome. This year the Action Agencies did not release a *draft 2004/2004–2008 Implementation Plan* for review and comment, but sought input throughout development of this plan. Because resources were extremely limited, the Action Agencies did not conduct a full-blown outreach effort, and limited input was received.

## Outreach efforts

Outreach efforts conducted by the Action Agencies to solicit input for this plan are listed below.

**July 2, 2003:** E-mail to states, tribes and other interested parties asking that they use the *2003/2003–2007 Implementation Plan* and *2002 Progress Report* as the basis for suggestions for improvements, additions or changes for this plan. The Action Agencies specifically requested suggestions for how to better accomplish the BiOp actions and how to better coordinate with the region to make the best use of resources. We asked to receive comments by July 31, 2003.

**July 3, 2003:** NOAA Fisheries Regional Forum Implementation Team (IT) briefing to follow up on the July 2, 2003, e-mail and answer any questions.

**July 16, 2003:** NOAA Fisheries Regional Forum Technical Management Team (TMT) briefing to follow up on the July 2 e-mail and answer any questions.

**July 17, 2003:** NOAA Fisheries Regional Forum System Configuration Team (SCT) briefing to follow up on the July 2 e-mail and answer any questions.

**July 17, 2003:** Council meeting briefing to follow up on the July 2 e-mail and answer any questions.

## Comments Received and Responses to Comments

**Comment:** July 9, 2003, e-mail from a representative of the Upper Columbia United Tribes (UCUT) stating that our notice and e-mail invitation did not constitute consultation with Indian Tribes.

**Action Agency response:** July 10, 2003, e-mail response agreeing that the invitation did not constitute formal, government-to-government consultation. The Action Agencies encouraged written input and offered to arrange a meeting if they had particular interest or issue that they wanted to discuss.

**Comment:** At the July 16, 2003, TMT meeting, it was suggested that the plan be responsive to the Council's Mainstem Amendments.

**Action Agency response:** The Action Agencies have included references to the Council's Mainstem Amendments in this plan and incorporated where appropriate.

**Comment:** At the July 17, 2003, SCT meeting the Action Agencies were asked to summarize projects selected to receive funding in the plan, the project work plans and in the Action Agencies BiOp database.

**Action Agency response:** The Corps spreadsheet (prepared by John Kranda) prioritizing FY04 CRFM spending is the most up to date list of projects to receive funding. The Corps distributed work plans at the July 2003 SCT meeting. The implementation plans are prepared early in the fiscal year when the CRFM appropriation is not known with certainty. Furthermore, research results that may affect project funding and project decisions on which there are differences of opinion may not occur until after the implementation plans are released. For example, the Ice Harbor removable spillway weir funding decision, has not yet been made. Because funding adjustments and revisions normally occur throughout the fiscal year, it is best to track project funding through participation in the monthly SCT meetings.

**Comment:** At the July 17, 2003, Council meeting, Council members and staff noted that the plan should address the Mainstem Amendments, that implementation planning needed to utilize existing forums and that regional coordination of the offsite program needed improvement. They also confirmed that the implementation plan is the appropriate place to verify coordination of federal and regional efforts and stressed that a draft plan should be released to provide them further opportunity for comment. They also reminded the Action Agencies that written comments submitted for the draft *2003/2003–2007 Implementation Plan* had not been adequately resolved and were being resubmitted for this plan.

**Action Agency response:** The Action Agencies have addressed the Mainstem Amendments and continue to use existing forums for development of the implementation plans. The Action Agencies worked with Council staff to finalize this plan and incorporated their comments where appropriate.

**Comment:** July 31, 2003, e-mail from Council Fish and Wildlife Program Director asking that the Action Agencies continue to discuss plan preparation and issues with him and other Council staff members.

**Action Agency response:** As the Action Agencies were preparing this plan, BPA staff met with Council staff to discuss issues pertaining to the integration of the Council's Fish and Wildlife Program and BiOp implementation planning. Issues discussed included the Council's Mainstem Amendments, subbasin planning and habitat, hatchery and harvest initiatives. To the extent practicable, the outcomes from these

discussions have been reflected in this plan. The Council and the Action Agencies will continue these discussions to further integrate and coordinate their respective efforts.

**Comment:** August 1, 2003, e-mail/letter from state of Montana Fish, Wildlife and Parks (MFWP). The letter iterated a number of comments regarding operation of Libby and Hungry Horse dams and the relationship between goals for resident species and downstream anadromous species.

**Action Agency response:** The Action Agencies believe our current operating plans for Libby and Hungry Horse, as described in this plan and the annual water management plans, are generally consistent with the MFWP comments. In addition, the Regional Implementation Forum in-season management process through the TMT allows for further refinement of operations to respond to specific operational requests as water conditions and requirements for ESA-listed species permit.

**Comment:** The MFWP also commented on some information from the Council that the Action Agencies should consider as well as some different approaches we might take in considering regional power supply issues and economic analyses that include more consideration for fish and wildlife resources.

**Action Agency response:** The Action Agencies will address these comments through the ongoing review and integration of the Council's Mainstem Amendments as well as in future evaluations of power generation and transmission issues.

This plan, while not released in draft form for comment and review, is dynamic and may be modified as needed. The Action Agencies are committed to continue working through the existing Regional Forums identified in this plan and will discuss any needed changes and concerns throughout the year. Because your comments can influence the implementation of specific activities and the development of future plans, we encourage submittal of your input throughout the year. Comments on this or future plans can be e-mailed to: federalcaucus@bpa.gov. Our mailing address is: Action Agencies Implementation Plan, c/o BPA-KEWS, P.O. Box 3621, Portland, OR 97208.

# Unresolved Issues

The Action Agencies have formulated their implementation plans to provide enough flexibility to adapt those plans to changes as needed or appropriate. This plan was formulated assuming the requirements of the 2000 BiOps will continue through 2004. There are several issues that are undergoing resolution during FY 2004 and beyond, but we have not attempted to predict their outcomes in this plan.

Currently, the most compelling issues are those identified under National Wildlife Federation v. National Marine Fisheries Service, which resulted in the U.S. District Court of Oregon remanding the BiOp to NOAA Fisheries to correct identified deficiencies. The court found NOAA Fisheries improperly relied on actions that had not undergone ESA consultation or were otherwise not "reasonably certain to occur." The court remanded the 2000 BiOp to NOAA Fisheries for revisions by early June 2004. In the meantime, the court left the 2000 BiOp in place, including ongoing implementation and reporting by the Action Agencies.

Other unresolved issues with potential to affect future implementation plans include the following:

- U.S. v. Oregon
- Columbia Snake River Irrigators Association and Eastern Oregon Irrigators Association v. Dept. of Commerce and NOAA Fisheries
- Snake River Basin Adjudication
- USFWS 2000 FCRPS Biological Opinion reconsultation
- Critical habitat designations for ESA-listed species
- Recovery Planning

# 2.0 Goals

The strategies and priorities in Sections 4.0 and 5.0 are designed to achieve Action Agency goals, as measured through the performance standards described in Section 3.0. The following goals are derived from the All-H Strategy. The Action Agencies expect to achieve these goals by accomplishing the outcomes and priorities identified in this plan and measuring progress through RM&E and performance standards.

## Goal 1

Avoid jeopardy and assist in meeting recovery standards for Columbia Basin salmon, steelhead, bull trout, sturgeon and other ESA-listed aquatic species that are affected by the FCRPS.

- Halt declining population trends within 5–10 years.
- Establish increasing trends in naturally sustained fish populations in each subregion accessible to the fish and for each ESA-listed population within a timeframe determined through recovery planning.
- Maintain and expand the current distribution of fish.
- Conserve genetic diversity and allow natural patterns of genetic exchange to persist.

## Goal 2

Conserve critical habitats upon which salmon, steelhead, bull trout, sturgeon and other listed aquatic species depend, including watershed health.

- Avoid adverse modification of critical habitat for ESA-listed fish, including salmon, steelhead, bull trout and sturgeon.
- Prevent further degradation of tributary, mainstem and estuary habitat conditions.
- Improve and prevent further degradation of water quality.
- Protect existing high-quality habitats.
- Protect and enhance habitats on a priority basis.
- In the long-term, attain state and tribal water quality standards in critical habitats in the Columbia River and Snake River basins.

## Goal 3

Assure tribal fishing rights and provide non-tribal fishing opportunities.

- Rebuild salmon and steelhead populations over time to a level that provides a sustainable harvest sufficient to provide for the meaningful exercise of tribal fishing rights and, where possible, provide non-tribal fishing opportunities.

## Goal 4

Balance other needs.

- Ensure that salmon, steelhead, sturgeon and bull trout conservation and BiOp measures are integrated with the Council's Fish and Wildlife Program (including the Mainstem Amendments) and are balanced with the needs of other native fish and wildlife species.
- Ensure that salmon, steelhead, sturgeon and bull trout conservation and BiOp measures are balanced with human needs, including FCRPS project purposes.
- In implementing recovery measures, seek to preserve resources important to maintaining the traditional culture of Columbia Basin tribes.

# 3.0 Performance Measures and Standards

Performance standards of the BiOp are central to this plan. For the long term, performance standards establish the level of improvement needed for survival and recovery in each stage of the salmon and steelhead life cycle. For the short term, performance standards provide clear but flexible objectives for evaluating the success of actions under the BiOps. At present, the performance standards apply only to salmon and steelhead. In the future, performance standards will be developed for bull trout and white sturgeon as recovery planning for these species progresses. What follows is a summary of the proposed performance standards.

Building on the findings of the *2003 Check-In Report,* performance standards are evolving as new information emerges. For the hydrosystem, the Action Agencies believe the primary performance standard should be juvenile total system survival with in-river juvenile survival as a secondary standard. For habitat, the Action Agencies are proposing to use a biologically based framework to prioritize habitat actions until specific biological performance standards are established. For hatcheries, the Action Agencies propose a prioritization system for implementing hatchery reforms to pursue the most cost-effective actions with the highest potential benefits to those ESUs most in need of better performance. For harvest, the Action Agencies continue to emphasize measures that will benefit ESA-listed fish, but currently do not have further performance standards or measures. The Action Agencies also plan to consider the ocean environment and its effects on life-cycle survival when assessing overall ESA performance. The Action Agencies continue to welcome input from interested parties in the region to build on these performance standards.

An RM&E program is being used to measure progress toward or compliance with these performance standards. The structure of the RM&E program detailed in Section 5.6 links directly with the performance standard framework identified in this section.

## 3.1 Classes or Tiers of Performance Standards/ Measures

Performance standards and associated performance measures are organized as a hierarchy configured to reflect a chain of physical/environmental and biological responses to management actions. Management actions are implemented (Tier 4) to cause changes in physical conditions and/or biological responses (Tier 3), which in turn affect lifestage specific survival (Tier 2) that collectively are reflected as a population response (Tier 1). This plan anticipates that performance standards can be refined over time at each tier and can be used to document performance progress.

**Performance Measure (Metric)** – the physical or biological parameter, in terms of a condition or response, that is monitored through time. Either an actual measurement or an estimate, a performance measure is the response that is tracked over the course of the RM&E program. It is the pulse that is monitored to assess progress towards or compliance with specified standards. A performance measure will have a performance standard associated with it.

For example, numbers of adult fish would be a metric used to measure performance. A performance standard would be met when these numbers meet or exceed a target set as a performance standard.

**Performance Standard –** a specified numerical objective or target deemed necessary to improve ecosystem function, improve salmon survival, and ultimately result in recovery for listed fish. A performance standard is the performance-level objective of a performance measure. A performance standard can be expressed as an absolute quantitative target, a change in condition from some baseline, or simply used to verify the proper implementation of a particular management action *(i.e.,* programmatic-level standard). Examples of performance standards include a specific level or quantity of adult fish, measured improvement in habitat conditions, escapement rates, egg-to-smolt productivity, etc.

### Tier 1 Population Level Performance Standards

ESU-based performance standards (Tier 1) are intended to provide long-term measures of success at the level of populations. ESU-level performance standards reflect contributions not only from the federal hydro system, but also from all other factors in the Columbia basin and the marine environment that affect salmon and steelhead recovery. These include federal, state, local, tribal and private conservation actions, the effects of harvest, hatcheries, land and water management, as well as natural factors and variations in climate and ocean conditions. Nevertheless, ESU-level population abundance indices represent the ultimate measure of our success under the ESA.

At the outset, there is the question of what ESU population targets should be. Preliminary recovery abundance targets have been identified in NOAA Fisheries' BiOp for several Snake and upper Columbia River ESUs and are reflected in the *2003 Check-In Report.* Refinement of these targets and development of recovery targets for the remaining ESUs are expected from ongoing work of the NOAA Fisheries Technical Recovery Teams (TRTs). This work will identify ESU-specific recovery standards that incorporate measures of abundance, productivity trends, species diversity and population distribution. The Action Agencies have provided funding for this work through a $1.2 million interagency agreement with NOAA Fisheries and expect this work to be completed shortly, resulting in updated ESU performance standards for all involved in Columbia River Basin activities.

The Action Agencies are currently using ESU abundance indices and the trends in those indices to track the performance of each listed ESU in their progress reports. Data on adult abundance are most readily available and trends can be promptly calculated to allow timely reporting of performance. As risk of extinction generally varies inversely with abundance, such indices both by themselves and in relation to other factors provide a cost-effective measure of ESU performance. Trends in the ESU abundance indicate if the ESU is increasing (trend >1), decreasing (trend <1), or stable (trend =1). Populations with increasing trends are at less risk of extinction.

ESU abundance indices can supplement calculations of population growth rate, or lambda, when it is available to provide additional insights on ESU viability. However, given the more stringent data requirements (*e.g.,* population age structure) and difficult assumptions that are dependent on ongoing research (*e.g.,* relative reproductive success of hatchery-origin fish), lambda generally is not available for annual, short-term use. With respect to lambda, the Action Agencies have placed a high priority on the collection of additional information on the reproductive success of hatchery-origin fish relative to natural-origin fish to help clarify this critical assumption. Once it can be resolved, the use of more sophisticated population viability analysis such as lambda may be appropriate and provide population level assessments with more certainty than is currently possible.

Measurement of ESU abundance and population-specific information will be critical in allocating recovery funding to address needed performance. Using performance-based management, the Action Agencies anticipate recovery actions and funding being targeted to those ESUs or specific populations in greatest need of assistance to achieve delisting of each ESU. Cost-effective methods must be applied to performance reporting in order to achieve actual recovery of the species.

# Tier 2 – Life-Stage Survival Performance Standards Update

## Hydrosystem

In developing the RM&E Plan, the Action Agencies'/ NOAA Fisheries' joint hydro work group addressed the following issues regarding survival standards for the hydrosystem. What follows is a summary; full details appear in the RM&E Plan.

The BiOp specified two classes of survival standards (goals) for stocks migrating through the hydrosystem (in-river and project-specific) and a third class for transported stocks (combined survival or system survival).

### *Survival standards for downstream migrant life stages*

**ESUs being transported**–The Action Agencies' preferred standard is the combined survival, or total system survival, attributable to passage through and around the hydrosystem. The standard is preferred because of the relative proportion of juvenile out-migrants that are transported at Snake River dams. This survival standard reflects the composite effects on in-river migrants, as well as those fish transported from collector dams. The survival of the transported fraction of the population reflects both direct effects and indirect effects ("D") associated with the transportation process. However, accurate and timely estimates of D may not be available for all transported ESUs, at least by the NOAA Fisheries BiOp 2005 check-in. For these stocks, in-river survival may be useful as a secondary standard until D is better understood.

**ESUs not subject to transportation**–For stocks that are not transported, in-river survival through the hydrosystem is the preferred standard. However, PIT-tag sampling limitations require that surrogate ESUs be used as indicators for many populations, most notably the use of Snake River stocks to represent mid-Columbia stock survival through the lower Columbia.

For each ESU, Table 3-1 shows estimated smolt survival as well as whether the estimate is empirical or model-derived. The survival performance standard is taken from table 9.2-3 in the NOAA Fisheries BiOp. For most ESUs, hatchery (H) and wild (W) fish would be combined to form one annual estimate. The response zone is that portion of the hydrosystem through which the estimate is obtained. It corresponds to that portion of the hydrosystem each ESU encounters.

### *Adult passage survival standards*

The preferred survival standard is the overall survival of adult salmonids migrating upstream through the hydrosystem. Monitoring this each year for each ESU is more difficult than

**Table 3-1. Performance Standards for Smolt Passage Survival for each ESU.**

| ESU | Index stocks | Nature of estimate & response zone | BiOp performance standard | |
|---|---|---|---|---|
| *Snake* | | | *Type* | *Survival %* |
| Spring/summer Chinook | H&W originating above Lower Granite | Empirical (Lower Granite to Bonneville) | 1. combined<br>2. system (in-river) | 57.6<br>49.6 |
| Fall Chinook | Lyons Ferry Hatchery & periodic validation with wild fish | Empirical (Lower Granite to Lower Monumental) & Model (Lower Monumental to Bonneville) | 1. combined<br>2. system (in-river) | 12.7<br>14.3 |
| Steelhead | H&W originating above Lower Granite | Empirical (Lower Granite to Bonneville) | 1. combined<br>2. system (in-river) | 50.8<br>51.6 |
| Sockeye | - | - | - | NA |
| *Upper Columbia (UC)* | | | | |
| Spring Chinook | 1. H&W originating above Lower Granite<br>2. UC hatcheries-potential | Empirical (McNary to Bonneville) | 1. system (in-river)<br>2. combined (if transported) | 66.4<br>66.4 |
| Steelhead | 1. H&W originating above Lower Granite<br>2. UC hatcheries-potential | Empirical (McNary to Bonneville) | 1. system (in-river)<br>2. combined (if transported) | 67.7<br>67.7 |
| *Mid-Columbia (MC)* | | | | |
| Steelhead | 1. H&W origin. above Lower Granite<br>2. MC hatcheries-potential | Empirical (entry to Bonneville) | 1. system (in-river) | 67.7 |
| *Lower Columbia* | | | | |
| Chinook | - | - | - | - |
| Steelhead | - | - | - | - |

it might seem. Historical estimates have been based on radio telemetry estimates that require intercepting and handling large numbers of adults, at considerable cost. As an alternative the RM&E work group recommended implementing and testing a PIT tag–based system over the next few years.

Table 3-2 shows proposed index populations that would be used to characterize adult passage survival for each ESU. Hatchery (H) and wild (W) fish would be combined to form one annual estimate. If adequate numbers of PIT-tagged wild fish were detected, a separate estimate could be calculated for the wild component.

## Additional Survival and Offsite Mitigation

Besides the hydro corridor juvenile and adult life-stage survival performance standards, the BiOp specifies a range of survival improvements needed in all other non-hydro stages of the life cycle (NOAA Fisheries BiOp Section 9.2.2.2, Table 9.2-4). These are estimated additional improvements in life-cycle survival needed to achieve survival and recovery standards after implementing hydro survival improvements. These survival improvements are to be achieved through a combination of "offsite mitigation" performed by the Action Agencies; actions by other regional, federal, state and tribal entities; and any natural increases in survival conditions (*i.e.,* ocean survival) relative to the base case years of the BiOp

**Table 3-2. Proposed Index Stocks to Characterize Adult Passage Survival for each ESU.**

| ESU | Index stocks | Response zone | BiOp performance standards (system or reach survival %) |
|---|---|---|---|
| ***Snake River:*** | | | |
| Spring/summer Chinook | H&W originating above LGR | Bonneville to Lower Granite | 85.5 |
| Fall Chinook | H&W originating above LGR | Bonneville to Lower Granite | 74.0 |
| Steelhead | H&W originating above LGR | Bonneville to Lower Granite | 80.3 |
| Sockeye | NA* | Bonneville to Lower Granite | 88.7 |
| ***Upper Columbia*** | | | |
| Spring Chinook | 1. H&W originating above PR.<br>2. all H&W originating above MCN | Bonneville to McNary | 92.2 |
| Steelhead | 1. H&W originating above PR.<br>2. all H&W originating above MCN | Bonneville to McNary | 89.3 |
| ***Mid-Columbia*** | | | |
| Steelhead | All H&W originating above MCN | Bonneville to McNary | 89.3 |
| ***Lower Columbia*** | | | |
| Chinook | to be determined | Bonneville dam | 98.1 |
| Steelhead | to be determined | Bonneville dam | 97.3 |

*Snake River sockeye are conserved under the Safety-net Hatchery Program; numbers are too limited to support tagging for assessing passage survival.

analysis. The BiOp states that these values are intended to provide perspective and enable NOAA Fisheries to make a qualitative judgment regarding the potential to improve the productivity of listed ESUs enough to avoid jeopardy. These values have practical limitations for their use as Tier 2 performance standards because they are not specific to particular life stages, but instead are a composite of improvements in all non-hydro life stages.

As noted in the BiOp, NOAA Fisheries planned to quantitatively define and apportion the composite non-hydro life-cycle improvements to specific life stages. However, this work has apparently not been done due to resource constraints. Until this additional guidance is provided by NOAA Fisheries, this composite has been used by the Action Agencies to identify where (and for what ESU populations) offsite mitigation efforts are most critically needed. This composite will be updated by the 2005 check-in to assess the combined improvements of all non-hydro life stages.

## Harvest

The Action Agencies focus to date has been to support harvest related projects consistent with the harvest strategies articulated in the Implementation Plans. Currently, all Action Agency funded activities that address the strategies in the Implementation Plan and are consistent with the five BiOp harvest BiOp actions receive Tier 4 programmatic credit. In reevaluating our harvest strategy, the Action Agencies seek to gain credit by improving harvest off site performance measures using a shift from programmatic credit to Tier 2 quantifiable adult life-stage benefits. Priority will be placed on actions that affect ESUs that are in the worst condition through either reconsultation and/or direct negotiation with NOAA Fisheries.

# Tiers 3 & 4 – Update on Performance Measures/Standards for Habitat, Hatcheries and Harvest

## Action Agency Approach

Until the life stage specific standards are further defined by NOAA Fisheries, the Action Agencies are focusing on mitigation needs and priorities at more specific, localized areas by developing and applying performance measures and standards at the Tier 3 physical and biological performance level and the Tier 4 programmatic level. The Action Agencies describe this proposed approach in this section.

## Habitat Performance Measures/Standards

Habitat performance standards identify the objectives or targets that need to be achieved through tributary habitat actions. Habitat physical and biological performance measurements relative to these standards identify where and what kinds of additional habitat improvements need to be implemented (*i.e.,* limiting factors). Information specific to geographic areas of an ESU is considered along with the effectiveness of different categories of habitat actions to determine the type and amount of habitat actions that need to be implemented for each area of an ESU.

Following this approach requires identification of performance standards, monitoring of performance measures and research on the effectiveness of actions. Currently the BiOp has only identified the population level performance needs (Tier 1) and the additional improvements in life-stage survival needed beyond the hydro and harvest improvements (Tier 2) assumed under the BiOp's Reasonable and Prudent Alternative (RPA). Physical and biological (Tier 3) habitat performance standards are planned to be identified through specific technical workgroups, TRT limiting factors and subbasin planning. The measurement of physical and biological performance and the effectiveness of habitat actions is being addressed through the RM&E Program, but it will take several years for reliable information from these efforts. In the interim the Action Agencies are planning and tracking habitat actions using programmatic level performance standards (Tier 4), available biological information and expert opinion linking biological benefit to the categories of actions that are programmatically being measured. (See Report 3 of the *2003 Check-In Report* for information on the existing habitat mitigation planning framework).

The Action Agencies have worked with other federal agencies to develop common programmatic performance measures to track Tier 4 actions to improve habitat. Programmatic Tier 4 metrics are the best available measurements at this time to track standard habitat accomplishments for projects undertaken by multiple agencies within the range of jeopardized ESUs. Standard guidelines for physical and biological Tier 3 performance measures and monitoring approaches have been developed by the NOAA Fisheries' and Action Agencies' RM&E team, as have pilot studies seeking to measure the biological benefits of specific habitat actions. These physical and biological measures for status monitoring and action effectiveness research are provided in the RM&E Plan that is currently being reviewed by the Independent Scientific Advisory Board (ISAB), the Independent Scientific Review Panel (ISRP) and the state and tribal fish agencies.

In addition, through the State-Federal-Tribal Monitoring Partnership, Pacific Coast Salmon Recovery Fund coordination and a contract with the state and tribal fish agencies, these measures are being compared with similar measures being used in other regional monitoring programs to produce common monitoring protocols and sampling designs. Later in 2003, a workgroup will be formed to begin developing performance standards for these Tier 3 physical and biological measures. In the interim, the Action Agencies remain focused on implementation and Tier 4 programmatic tracking of habitat improvements at the ESU level.

The Federal Programmatic Habitat Metrics Template (shown in Table 3-3) tracks individual on-the-ground project accomplishments for protecting, enhancing and restoring habitat to benefit fish. Data identified in the metrics template are primarily quantitative and reported per project and can be accumulated for each ESU and each subbasin to provide a picture of habitat accomplishment.

The Action Agencies would also like to achieve, based on streamlined habitat tracking metrics, a common system measuring habitat condition among federal and state agencies and tribes. In upcoming months, this concept will be discussed with states and tribes, as will the capability to collect habitat performance measure data from those entities for a regional database.

## Hatchery Performance Measures/Standards

Many efforts have proceeded to establish performance measures for artificial propagation programs. Artificial propagation programs can have both positive and negative effects on naturally spawning populations of salmon and steelhead. To increase the benefits and reduce adverse effects, the region has undertaken a comprehensive effort to reform propagation programs. Reform is being accomplished primarily through the coordinated efforts of the Council's Artificial Production Review (APR) and NOAA Fisheries' ESA consultations. In December 2000, NOAA Fisheries revised the APR's 24 proposed performance standards and indicators for hatcheries in response to ISAB review and developed a

**Table 3-3.Federal Habitat Metrics Template for Tributary and Estuary Programmatic Habitat Performance Measures.**

| Actions | Federal Actions Supporting Habitat Improvements (**Bold** actions indicate core measurable habitat actions derived from FCRPS BiOp Tier 3 effectiveness monitoring categories) | Primary Benefit | Reporting Metrics (per action) |
|---|---|---|---|
| 1. In-stream-structural | **Improve stream structure/reconfigure stream morphology** | Stream complexity restoration | Number of stream miles treated (to 0.1 miles) |
| 2. In-stream-passage | **Upgrade or eliminate culverts** | Barrier removal | Number of miles habitat accessed/action (to 0.1 miles) |
| | **Eliminate barriers** (remove diversions, dams, mine tailings, low water crossings, install fish ladders) | Barrier removal | Number of miles access (to 0.1 miles) |
| 3. Fish screens | **Install/retrofit fish screens to NOAA Fisheries/USFWS standards** | Screen irrigation diversions | Size of each diversion screened including rate (cfs) and duty (quantity) |
| 4. Riparian conservation | **Riparian habitat improvement/restoration treatments** | Riparian function restoration | Riparian miles (to 0.1 miles) and acres treated, thinned, fenced each side of stream |
| | **Secure long-term riparian protection/conservation easements** | Riparian function restoration | Number of stream miles (to 0.1 miles) and total acres each side of stream |
| | **Acquire productive fish habitat** | Riparian function restoration | Number of miles (to 0.1 miles) and acres/action |
| | **Streambank stabilization treatments** | Riparian function restoration | Number of miles (to 0.1 miles) |
| 5. Water quantity | **Lease or purchase instream flows** (wet water) | In-stream flow restoration | Amount of water (cfs), stream reach improvement (miles), timing (season) of effect; miles meeting ESA needs |
| | Water measurement | Assess flows and consumptive use | Number of gauging or demand measurement devices installed, stream reach measured (miles), amount of water (cfs) |
| | **Water conservation projects, Special use permits** (actual water conserved through modified irritation application, delivery, change in point of diversion, well, etc) | In-stream flow restoration | Amount of water returned to in-stream use (cfs), stream reach (miles) affected, timing (season) of effect; miles meeting ESA flow needs |
| | Water right adjudication | Identify water resource allocations, risk | Percent of rights adjudicated |
| | Apply EPA BMPs, federal standards and guidelines to agricultural areas, silvicultural activities, abandoned mine sites, construction sites, and other nonpoint source water quality effects associated with operation of dams and other hydrologic modifications | Water quality improvement | Number and size (acres) where BMPs, S&Gs applied; detected water quality improvements; Reaches removed from 303(d) list. |

**Table 3-3.Federal Habitat Metrics Template for Tributary and Estuary Programmatic Habitat Performance Measures continued.**

| Actions | **Federal Actions supporting Habitat Inprovements** (**Bold** actions indicate core measurable habitat actions derived from FCRPS BiOp Tier 3 effectiveness monitoring categories) | **Primary Benefit** | **Reporting Metrics** (per action) |
|---|---|---|---|
| 6. Water Quality | Tributary and Mainstem Wetlands restored/created | Water Quality improvement | Number of acres |
| | Apply EPA BMPs, federal standards and guidelines to agricultural areas, silvicultural activities, abandoned mine sites, construction sites, and other nonpoint source water quality effects associated with operation of dams and other hydrologic modifications. | Water quality improvement | Number and size (acres) where BMPs, S&Gs applied; detected water quality improvements; Reaches removed from 303(d) list. |
| | **TMDL implementation** | Water quality improvement | Miles improved, Number and Percent of reaches removed from 303(d) list |
| 7. Roads | Improve roads hydrologically connected to streams | Sediment reduction | Miles of road decommissioned or upgraded |
| | Decommission roads hydrologically connected to streams | Sediment reduction | Miles of road decommissioned or upgraded |
| 8. Estuary | **Protection/acquisition** | Protect habitat | Number of acres wetlands and key habitats protected |
| | **Restoration** | Riparian function restoration | Number of acres wetlands and key habitats restored |
| | **Passage** | Barrier removal | Number of acres/miles habitats opened |
| | Predator treatments | Reduce mortality by altering predator abundance/distribution | Number of actions completed |

prioritized subset of the APR standards most pertinent to the Action Agencies' implementation of ESA responsibilities. Areas for development of performance standards and suggested hatchery performance standards are presented in section 9.2.3 of the BiOp for incorporation into Phase III Hatchery Genetic Management Plans (HGMPs). Table 3-4 shows a comparison of hatchery performance standards prepared through the Council's APR with those presented in the BiOp.

The hatchery reform effort is seriously hampered by the lack of understanding of many of the effects of propagation programs. In many cases, the programs' benefits are not regularly evaluated. Similarly, the programs' adverse effects are not regularly evaluated. And, for many potential risks, the effects of artificially propagated fish on the viability of naturally spawning populations are not sufficiently understood. For a detailed discussion of these issues, refer to the ISAB's June 3, 2003, report, *Review of Salmon and Steelhead Supplementation.*

## Interim Hatchery Performance Measures

Based on APR and BiOp performance standards, the Action Agencies are considering the following interim performance measures for BPA-funded Lower Snake River Compensation Plan (LSRCP), Reclamation, Corps and Fish and Wildlife Program hatcheries located in the FCRPS or impacting one of the eight jeopardized ESUs:

### *Planning*

By December 1, 2003, a Phase II HGMP will exist for each BPA-funded artificial propagation program in the Columbia River Basin with the potential to take listed salmon and steelhead. These plans will include goals and objectives, operational protocols that address key hatchery activities and minimize risks, alternatives to improve operational protocols and effects on listed populations. By May 1, 2004, a NOAA Fisheries–approved Phase III HGMP will exist for each BPA-

**Table 3-4. Performance Standards for Hatcheries.**

| Area for Standard Development | Comparable APR Standard | Suggested BiOp Hatchery Performance Standard |
|---|---|---|
| **Genetic introgression** | Patterns of genetic variation within and among natural populations do not change significantly as a result of natural production. | Local, within-ESU, broodstock is used in all propagation programs within critical habitat, unless associated with an isolated program. Hatchery broodstocks used in supplementation programs represent the genetic and life-history characteristics of the natural population(s) they are intended to supplement. Non-isolated hatchery programs regularly infuse natural-origin fish into the broodstock, as described in an approved HGMP. |
| **Hatchery-origin fish straying** | Artificially produced origin adults in natural production areas do not exceed appropriate proportion of the total natural spawning population. | For naturally spawning populations in critical habitat, non-ESU hatchery origin fish do not exceed 5 percent; ESU hatchery-origin fish do not exceed 5 to 30 percent, unless specified in an HGMP for a conservation propagation program. |
| **Marking** | Releases are sufficiently marked to allow statistically significant evaluation of program contribution of natural production, and to evaluate the effects of the program on the local natural population. | Hatchery populations are properly marked so as not to mask the status of natural-origin populations or the capacity and proper functioning of critical habitat. |
| **Viable and critical population thresholds** | Artificial propagation program contributes to an increasing number of spawners returning to natural spawning areas. | Hatchery operations do not appreciably slow a listed population from attaining its viable population abundance. Hatchery operations do not reduce listed populations that are at, or below, critical population abundance. |
| **Harvest effects** | Fish produced for harvest are produced and released in a manner enabling effective harvest, as described in all applicable fisheries management plans, while avoiding over-harvest of non-target species. | Federal hatchery mitigation fish produced for harvest do not cause subsequent over-harvest of listed stocks such that their recovery is appreciably slowed. Harvesting reforms are implemented to maintain and enhance harvest of mitigation fish in consideration of the constrained productivity of listed stocks caused by the FCRPS and other development. |
| **Hatchery planning** | Program addresses ESA responsibilities. | Hatchery goals and objectives, operational protocols, monitoring and evaluation, anticipated effects, and relationship to other critical management and planning processes are fully described in approved HGMPs. |
| **Research** | For research hatcheries: The artificial propagation program is monitored and evaluated on an appropriate schedule and scale to address progress toward achieving the experimental objective and evaluate beneficial and adverse effects on natural populations. | Scientific knowledge is increasing on the effects of hatchery supplementation and captive broodstock programs on the survival and recovery of natural-origin populations. The quality and survival of hatchery supplementation fish are increasing. |

funded artificial propagation program in the basin that has the potential to take listed fish.

Performance measure

The number of Phase II HGMPs submitted to NOAA Fisheries compared to the number of artificial production programs for which Phase II HGMPs have not been submitted. The number of Phase III HGMPs submitted to NOAA Fisheries compared to the number of artificial production programs for which Phase III HGMPs have not been submitted.

### *Genetic introgression*

For each artificial propagation program identified as an integrated program, either:

1. Endemic broodstock is being used, or
2. Endemic broodstock is being collected to replace a non-endemic broodstock, or
3. Production levels are being reduced to avoid adverse genetic introgression to naturally spawning populations.

Annual performance measure

- The number of integrated programs with endemic broodstocks compared to the number of integrated programs for which actions are being undertaken to change to endemic broodstocks,
- The number of integrated programs using non-endemic broodstocks and
- The number of integrated programs using non-endemic broodstocks but for which production levels are being reduced to avoid potential for adverse genetic introgression and outbreeding depression.

### *Optimal use of natural broodstock*

For each integrated, artificial propagation program, the Phase III HGMP will identify a broodstock collection protocol that specifies the proportion of natural-origin fish in the broodstock, including up to 100 percent natural-origin fish in the broodstock under optimal conditions.

Annual performance measure

The number of integrated programs with Phase III HGMPs that include a broodstock collection protocol optimizing the use of natural-origin fish compared to the number of integrated programs that do not have such protocols.

### *Fish straying*

For each artificial propagation program identified as an isolated program, hatchery-origin adults will make up less than five percent of any non-target natural spawning populations.

Annual performance measure

The number of evaluated isolated programs for which hatchery-origin adults do not make up more than five percent of any non-target natural spawning population (five-year geometric mean) compared to the number of isolated programs for which hatchery-origin adults make up more than five percent of one or more non-target populations and to the number of isolated programs for which the quantitative information on adult straying to natural spawning populations is not known.

For each integrated, artificial propagation program, the Phase III HGMP will identify a management protocol that specifies the proportion of hatchery-origin fish in the target, naturally spawning population.

Annual performance measure

The number of integrated programs with Phase III HGMPs that identify a protocol for management of hatchery-origin fish in the target, naturally spawning population compared to the number of integrated programs with Phase III HGMP not containing such a protocol.

### *Marking*

For each artificial propagation program, the Phase III HGMP will identify a marking protocol that reflects objectives of harvest management and the need to distinguish the origin of fish in target and non-target naturally spawning populations.

Annual performance measure

The number of Phase III HGMPs with marking protocols sufficient to achieve harvest management objectives consistent with program goals and objectives and distinguish the number of adult hatchery-origin fish in naturally spawning populations compared to the number of Phase III HGMPs without such marking protocols.

### *Harvest*

For each artificial propagation program, the annual harvest of hatchery-origin fish in each marine and freshwater fishery will be documented.

Annual performance measure

The number of programs for which harvest is estimated from tagging data compared to the number of programs for which harvest is not estimated.

During 2004, BPA plans to require BPA-funded hatchery operators to begin reporting on progress in meeting the Interim Performance Standards. Annual reporting requirements will be incorporated into operation and maintenance agreements for Fish and Wildlife Program

hatcheries and the direct funding agreements for LSRCP, Reclamation and Corps facilities.

### *Harvest Performance Measures/Standards*

NOAA Fisheries wrote the harvest RPA's with the intent that if any quantitative survival benefits occurred through project implementation, the benefit would be a bonus to any anticipated benefit gained from hydro, hatchery and habitat actions. Currently, all Action Agency funded activities that address the harvest strategies in the implementation plans and are consistent with the five BiOp harvest RPA actions receive Tier 4 programmatic credit. The Action Agencies seek to pursue future activities that will yield quantitative adult life-stage survival benefits. If survival improvements are gained through project implementation, then quantitative crediting mechanisms toward offsite mitigation would be developed.

# 4.0 Strategies to Achieve Recovery

## All-H Approach

This plan is guided by a fundamental strategy: the implementation of recovery actions broadly and comprehensively across all aspects of the salmon life cycle. This "All-H" approach is the centerpiece of the Federal Caucus' All-H Strategy, is supported by scientific reviews and is consistent with principles in the Council's Fish and Wildlife Program, the Tribal Salmon Recovery Plan, the Four Governors Recommendations and other state plans. More important, the All-H Strategy addresses fish recovery actions by all federal agencies. The Federal Caucus is developing a method to track implementation progress by other agencies that contribute to the recovery of listed species.

Supported by the All-H Strategy, the NOAA Fisheries BiOp and this plan rely on measures that extend well beyond the FCRPS. In addition to improvements in dams and dam operations, they provide "offsite mitigation" for federal hydrosystem effects in the form of habitat protections and improvement, hatchery reforms and support for more selective harvest. These offsite mitigation efforts must be integrated with efforts undertaken through existing mitigation programs such as the Council's Fish and Wildlife Program. Although the USFWS BiOp does not require implementation of offsite mitigation actions for bull trout or Kootenai white sturgeon, many of the Action Agencies' offsite activities provide protection to a wide variety of fish and wildlife.

This section describes the strategies identified by the Action Agencies to carry out their share of implementing the All-H Strategy in all of these areas. Others must also implement actions for Columbia Basin fish recovery to succeed. Because an All-H approach provides the best chance for meeting recovery goals, the scientific principles agreed to by the members of the Federal Caucus were adopted as part of the foundation for this plan. These principles are:

- Conservation and recovery of Columbia basin fish and aquatic species must address all aspects of the ecosystem and the species' life cycle.
- Conservation and recovery requires a network of diverse, high quality, interconnected habitats and high water quality. Natural systems functioning properly are crucial to rebuilding fish populations.
- Conservation and recovery requires preservation of life history diversity, genetic diversity and metapopulation organization. These characteristics affect the response of anadromous and resident fish populations to both demographic variation and variation in climate and environment.
- Because human activity, development and population growth will continue, conservation and recovery depend on managing these human impacts to achieve suitable ecosystem conditions for fish.
- Technology and research can be used to increase our understanding of natural functions but cannot replace them.
- Viability (or status) of salmon and steelhead populations can be evaluated based on abundance, productivity, population structure and genetic diversity.

The strategies and substrategies of this plan support the approach of the All-H Strategy. Strategies and substrategies—and specific activities and measures planned for the next year and next five years—are more fully described in Section 5.0. Further detail is provided in Appendix A.

## Integrating BiOp Implementation with the Council's Fish and Wildlife Program

Consistent with the principles of the All-H Strategy, the Action Agencies are implementing many of the offsite mitigation actions required by the NOAA Fisheries BiOp through the Council's Fish and Wildlife Program. Under the Northwest Power Act, the Fish and Wildlife Program is tasked with protection, mitigation and enhancement of Columbia River basin fish and wildlife affected by the development and operation of the FCRPS. The Provincial Review process, sponsored by the Council, provided the mechanism for integrating activities under the existing Fish and Wildlife Program with the ESA focused measures of the NOAA Fisheries and USFWS BiOps. Even while there is current focus on ESA-listed fish, including bull trout and Kootenai River white sturgeon, unlisted species including resident fish and wildlife also benefit from the holistic, ecosystem approach that is the basis of the All-H Strategy.

The Council and BPA will continue to work together to integrate BiOp implementation requirements within the existing administrative process of the Council. For example, using the Provincial Review cycle as the source of proposals for both the Fish and Wildlife Program and BiOp implementation directly engaged a broad range of entities in support of ESA objectives in the near term. In the future, subbasin planning will further integrate Council Fish and

Wildlife Program and ESA objectives at the local level. Local level subbasin plans will involve many entities that may not have previously participated in the Council processes. This is expected to improve the coordination and implementation of actions taken by various entities within a subbasin. Subbasin planning will support development of agreed upon biological priorities and should improve the allocation and use of limited and varied funding sources.

## The Council's Mainstem Amendments

The Council recently completed nearly two-years of public review and adopted mainstem amendments to its Fish and Wildlife Program. The Mainstem Amendments contain a description of river conditions and include cost effective measures intended to protect, mitigate and enhance all the fish and wildlife of the Columbia River Basin that have been affected by the development, operation and management of the FCRPS. The amendments adopt measures oftentimes similar to those in the NOAA Fisheries BiOp. Progress reports on implementation of the Council's recommendations are also requested. To highlight relationships between the BiOp and the Mainstem Amendments, the Action Agencies have chosen to expand the scope of their Implementation Plans and Progress Reports to include mainstem amendment reporting.

## The Provincial Review Process

During 2001 to 2003, Provincial Reviews were conducted by the Council based on subbasin assessments and review by the Independent Science Review Panel (ISRP), NOAA Fisheries, BPA, the Columbia Basin Fish and Wildlife Authority (CBFWA) and others. Project selection criteria reflected likely contribution towards progress in achieving NOAA Fisheries BiOp performance standards. The process for each Province resulted in three years of carefully selected, scientifically based projects. Subsequent Provincial Reviews will benefit from the inventory, assessment and management plans expected from completed subbasins plans.

## Subbasin Planning

The Action Agencies have been supporting subbasin planning in two general phases: (1) as noted previously, by using subbasin assessments, BiOp criteria and ISRP reviews to inform the Provincial Reviews; and (2) providing funding to develop detailed subbasin plans. State and local entities are managing subbasin planning using BPA funding and with Council oversight.

Beginning in 2002, BPA entered into contracts with the Council to develop subbasin plans for the entire Columbia River basin. Under the contracts, state subbasin planning coordinators were designated in Idaho, Montana, Oregon and Washington. The contract also provides for a subbasin planning template approved by NOAA Fisheries, a regional coordination board and subbasin work plans. By June 2004, plans for all 62 subbasins should be completed.

Subbasin plans are under development and are scheduled to be completed, reviewed through a public process and amended into the Council's Fish and Wildlife Program in the December 2004 to January 2005 timeframe. The future structure of Provincial Reviews or a replacement project solicitation process has not yet been developed by the Council.

The subbasin plans are being developed in close coordination with NOAA Fisheries and the USFWS to ensure the integration and prioritization of ESA-focused project activities in the Council's Fish and Wildlife Program. Other federal agencies are also participating in the subbasin planning process. They are providing information generated through past agency efforts and participate in the local, state and regional level coordination groups chaired by the Council.

# Integrating BiOp Implementation with Technical Recovery Teams

Under the guidance of NOAA Fisheries, Technical Recovery Teams (TRTs) have been formed for the Willamette/Lower Columbia and the Interior Columbia regions. The TRTs are charged with identifying and gathering the information needed to provide the scientific basis for anadromous salmonid recovery and the Council subbasin plans. The Action Agencies anticipate that the TRT work products will provide additional information necessary to prioritize NOAA Fisheries BiOp implementation projects among those addressing the broad range of regional fish and wildlife needs. These products include: the identification of fish populations; population viability goals for abundance; ESU-wide delisting scenarios; and, habitat characterizations and limiting factors/factors for decline analyses. Consequently, our ability to locate projects in direct support of the populations at greatest risk will improve significantly as these products are developed.

In a similar fashion, the USFWS has formed TRTs for Kootenai River white sturgeon (KWS) and bull trout. The completed KWS Recovery Plan recommended the continuation of the KWS hatchery program and called for implementation of VarQ to increase the likelihood of spring flow augmentation for the benefit of naturally spawning KWS. The Kootenai Tribe of Idaho, in coordination with the KWS Recovery Team, is overseeing a U.S. Geological Survey (USGS) investigation of mainstem habitat modification. The Corps

of Engineers, also in coordination with the KWS Recovery Team, is also investigating increased discharge capacity to enable flow augmentation at Libby Dam. With the designation of critical habitat in 2002 the action agencies have asked to re-initiate consultation on the KWS biological opinion. The new biological opinion is expected to be completed in the spring 2004. Modifications to the current ramping rates, habitat modifications and additional reliance on the sturgeon hatcheries are likely outcomes.

The bull trout TRT is tasked with designating critical habitat and the development of a draft Recovery Plan. The USFWS has finished a draft bull trout recovery plan as of summer 2003 and plans to have the final recovery plan complete by mid-2004.

The mix of projects and priorities funded by the Action Agencies will evolve as our decision-making becomes informed by the results of the two important planning efforts for region-wide fish recovery: subbasin planning and ESA recovery plans.

## Evaluating BiOp Implementation: The Importance of RM&E

This plan covers hundreds of individual BiOp actions throughout the Columbia River basin. While some BiOp actions may be addressed by a single project, others may require multiple projects or a comprehensive basinwide program, *e.g.,* monitoring and evaluation. To meet recovery goals, the management of fish and wildlife restoration projects will require increased accountability, and a shift from the past approach of evaluating progress at the level of individual projects to evaluation of progress on a larger scale. Adaptive management provides a valuable tool for ensuring that activities can be re-directed if necessary in response to what we learn as projects progress. The RM&E program described in this plan will provide the feedback loop for evaluating future priorities for projects. Our ability to mount a focused and comprehensive effort basinwide will increase as the subbasin plans and TRT products are completed, the next round of Provincial Reviews move forward, and the elements of the All-H Strategy are implemented by others.

Currently there is a broad group of state, tribal and federal agencies working together under the Pacific Northwest Aquatic Monitoring Partnership (PNAMP) to coordinate multiple regional monitoring programs. This effort is expected to result in agreement on common monitoring protocols and development of a coordinated and comprehensive monitoring network that includes all of the Columbia Basin listed ESUs.

## Coordinated Database and Tracking System

The Action Agencies have jointly developed a database to track BiOp project planning and implementation. The database is also being used to identify areas where the full range of actions (the "gaps") necessary to achieve adequate progress towards BiOp performance standards may be lacking.

The project level detail in this database includes:

1. Associated strategy and substrategy;
2. Associated BiOp requirements, including RPA Actions;
3. Benefited ESA-listed ESUs or species;
4. Location by subbasin;
5. Expected deliverables by year; and,
6. Annual accomplishments or progress.

The database facilitates the comparison and accumulation of projects within a substrategy (within and across subbasins and ESUs) in a way that supports internal (to the FCRPS) and external progress reporting. The database also provides and framework for coordinating implementation activities with non-FCRPS Action Agencies and among state agencies and regional tribes.

## Conclusions–Linking Related Planning Initiatives

The Action Agency Plans will facilitate achievement of the goals of the All-H Strategy by integrating three distinct layers of planning efforts (Provincial Reviews, subbasin plans and recovery plans) and by developing a monitoring and evaluation program that will provide a mechanism for evaluation. The convergence of these processes will provide the foundation for an integrated region-wide, coordinated approach to life-cycle improvements. This coordination is essential for comprehensive and effective protection, improvement and restoration projects under all Hs.

These three major planning initiatives should not be viewed separately from each other. Much of the Action Agency implementation of the offsite component of the NOAA Fisheries BiOp has been conducted through the Provincial Review process. As noted earlier, the next round of Provincial Reviews will be further informed by the outcomes of subbasin planning and recovery planning efforts. The Federal Caucus has acknowledged that subbasin plans provide an appropriate platform for coordinating Action Agency, regulatory agency and land use agency efforts to coordinate efforts in support of recovery. For example, NOAA Fisheries has proposed that subbasin plans provide the framework for "local recovery

plans." On completion, recommendations from the TRTs and the Council's subbasin plans will provide guidance to future Action Agency implementation actions and plans.

Although all subbasin plans will display some unique characteristics, the fact that they will address a set of common elements enables the Action Agencies to use their recommendations to identify priorities across subbasins, within an ESU, or across the Columbia River basin. Finally, the development of a monitoring and evaluation program will provide a mechanism for program course corrections not previously available in the region.

# Policy and Information Updates

Policy and information updates may cause this plan to be adjusted. Adjustments may result in the Action Agencies issuing amendments to this plan. NOAA Fisheries, USFWS, states and tribes will be notified if it is determined that plan amendments are warranted.

# 5.0 Priorities, Work Plans and Outcomes (2004–2008)

The activities listed in this plan presume known and anticipated resources and funding to implement the recommended actions in the BiOp. The Action Agencies considered several factors in the prioritization and selection of activities. The following questions were implicitly considered in the preparation of this plan:

1. Does the action(s) provide immediate and significant measurable survival or production benefits to ESUs jeopardized by the FCRPS?
2. Does the action benefit ESUs jeopardized by the FCRPS?
3. Can the action provide broad ecological benefits to multiple life stages, species, stocks, or ESUs of listed species?
4. Does the action reduce critical uncertainties or provide information needed to support adaptive management, accountability, or crediting for listed species?
5. Does the action build on or complement ongoing, beneficial actions that support delisting of listed species?
6. Is the action specifically recommended in the BiOp?
7. Is there known or anticipated assurance of funding?

The following factors also influenced priority-setting:

- **Near-term opportunities.** The five-year priorities for 2004–2008 reflect specific initiatives or projects called for in the NOAA Fisheries and USFWS BiOps as near-term actions. These actions fall into one or more of several important categories: (1) early-action opportunities with clear potential survival benefits to listed stocks; (2) preliminary work in preparation for implementation of such actions; and (3) RM&E actions that address key uncertainties.
- **Funding availability.** The Reclamation and Corps measures identified in this plan assume appropriations will be received at levels requested in the President's budget.
- **Least-cost planning.** The Action Agencies are evaluating least-cost planning principles as an effort to ensure investments achieve the greatest survival benefits at least cost. In essence, the Action Agencies would create a structured approach for evaluating alternatives across the Hs to meeting the NOAA Fisheries BiOp performance standards at least cost.
- **Mainstem Amendments.** The Mainstem Amendments seek to optimize actions that produce the greatest biological benefits for targeted species with the least cost, avoid adverse impact to other species and provide an adequate, efficient, economical and reliable power supply. The Action Agencies will work with the Council to define a least-cost methodology that integrates both ESA and Council objectives.
- **Mid-point check-ins.** In addition, the Action Agencies are placing a high priority on implementing those actions that specifically contribute to the progress expected by NOAA Fisheries for the 2005 and 2008 mid-point evaluations noted in their BiOp.

  **The 2005 mid-point evaluation** will shift from evaluation of programmatic accomplishments toward assessments of biological results of program implementation. The assessments of results are expected to include population growth rates, abundance and other biological factors for each ESU. Accordingly, we have shifted our presentation to focus on actions for ESUs in this implementation plan.

**The 2008 evaluation** will be a refinement of the analyses performed in the 2005 evaluation. It is expected to focus even more on the biological results of actions and report survival changes in populations of each ESU.

There have been varying levels of priority setting the Hs. Some of these priorities have been set in the BiOp and those priorities are reflected in this plan. For example, many of the water management actions for flow augmentation came from the BiOp. Some priorities are established in ongoing regional processes. Many of the Corps project configuration actions had priorities set in the Columbia River Fish Mitigation (CRFM) program coordinated through the SCT.

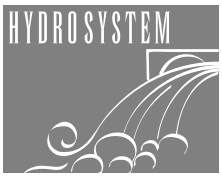
At this point, there has been little or no priority setting Hs. For example, we have not considered the effectiveness of a flow augmentation action relative to a habitat improvement action because we currently have insufficient information to support such decisions. If appropriate, we will do this in future years as the program and science evolves.

The remainder of this section provides, by strategy and substrategy, information on the priorities and expected outcomes of the actions in this plan. Information is provided in this order:

- **Five-Year (2004–2008) Outcomes,** which identify fish

recovery actions the Action Agencies intend to complete by 2008.

- **2004 Work Plans,** detailing specific projects planned for FY04.
- **2005–2008 Work Plan,** highlighting key projects or scope of work planned in the following years.
- **Regional Coordination,** which identifies regional forums involved with the implementation of certain strategies. Section 6.0 of this plan identifies the primary regional coordination forums.




## 5.1 Hydrosystem Priorities

During development of the 2000 BiOps, the effect of current hydrosystem operations and dam configuration on ESA-listed fish was estimated using the Simpas model and available empirical information (NOAA Fisheries 2000 BiOp, Appendix D, tables D-1, D-2 and D-3). The potential increase in juvenile survival that may be achieved through modified hydrosystem operations and/or dam passage facilities was also calculated using the model (Appendix D, Tables D-4, D-5 and D-6). These modifications were used by NOAA Fisheries as a basis to determine hydrosystem performance standards.

The hydrosystem strategies were developed to guide actions that improve survival of ESA-listed fish through the hydrosystem and to improve Kootenai River white sturgeon spawning. The NOAA Fisheries BiOp acknowledged long-term Clean Water Act goals for total dissolved gas (TDG) and water temperature, which were considered complementary to other recovery actions. The near-term and primary focus is to achieve the juvenile and adult survival performance standards. Efforts to meet Clean Water Act standards have been viewed as longer term goals, and long-term variances to the 110 percent TDG standard have been adopted by the states to enable implementation of the 2000 NOAA Fisheries BiOp spill program to enhance achievement of ESA performance standards. Furthermore, the Council's mainstem amendments also state as an objective the "meeting of state and federal water quality standards under the Clean Water Act."

### Hydrosystem Actions Under Consideration

Since the BiOps were issued in December 2000, research and evaluation have continued, revealing new information about BiOp implementation and performance results. In 2003, the Action Agencies implemented research aimed at further understanding the effectiveness of hydrosystem actions. Results of 2003 research will be presented to the region during the annual Anadromous Fish Evaluation Program (AFEP) Review November 18–20, 2003.

In addition, as described in Section 4.0, Strategies to Achieve Performance Standards, part of the All-H approach by the Action Agencies is to integrate implementation of ESA measures with related regional actions. In April 2003, the Council adopted mainstem amendments to its Fish and Wildlife Program that contain several recommendations aimed at enhancing the biological and cost effectiveness of hydrosystem actions. Based on a review of the Council's amendments and an assessment of expected research results, the Action Agencies together with NOAA Fisheries for ESA-listed anadromous fish and USFWS for ESA-listed resident fish jointly identified a set of potential modifications to hydrosystem actions and evaluations that could maintain or accelerate progress in achieving performance standards. The Action Agencies intend to discuss these potential hydrosystem actions and evaluations through the NOAA Fisheries Regional Implementation Forum teams in November and December 2003 and to make decisions on 2004 implementation early in the year. The following actions are being considered for evaluation and/or implementation during the 2004 to 2008 time period.

#### Systemwide summer spill operations

The Council's mainstem amendments recommend that the Action Agencies evaluate the effectiveness of summer spill and assess whether similar benefits can be provided at less cost. In addition, on August 26, 2003, the regional executives of NOAA Fisheries, the Corps and BPA issued a joint statement specifying, "that they have a responsibility to the region to devise an approach that is less costly while maintaining the ability to achieve the biological objectives for salmon and steelhead and will work with all interested parties in the region to accomplish this objective."

There are two regional efforts underway in response to this policy-level direction. CBFWA, in coordination with Council staff, is leading a multi-agency effort developing options for summer spill evaluations, including development of study designs and an assessment of alternative mitigation actions that could provide similar or greater benefits than the current summer spill program. In addition, the IT and TMT of the Regional Implementation Forum are reviewing historical summer migration data and considering its application to in-season management of the 2000 NOAA Fisheries BiOp spill operations.

The Action Agencies are actively participating with other

regional representatives in both of these efforts and expect to implement a spill program in 2004 that is responsive to the regional executives' and Council's policy guidance to achieve biological objectives at a reduced cost.

## Turbine operations

The effectiveness of operating turbines near best efficiency (*i.e.,* within + 1%) is not well understood. Recent evaluations of turbine passage survival and hydraulic model observations suggest that operation outside (on the high end) of the ±1 percent range may be beneficial for fish passage. As such, there may be opportunities to reduce turbine operational costs associated with fish protective measures while providing similar or greater survival benefits than current operations.

The primary financial impact of the current turbine operating range occurs at McNary and Bonneville dams. Results from a 2003 pilot study of radio-tagged fall Chinook at McNary will inform the feasibility of further evaluations at that site. For the long term, the Turbine Survival Program work groups are discussing further biological index testing to inform turbine operations relative to optimizing survival. These efforts are consistent with the Council's mainstem amendments, which request that the Action Agencies evaluate turbine operations to optimize survival and cost effectiveness.

## Configuration alternatives

The intent of the following options is to achieve similar or greater project survivals while reducing spill levels. As we develop the options, and if they are implemented, we would adaptively address necessary spill/operational requirements to meet biological opinion performance objectives at least cost.

- Installation of a removable spillway weir (RSW) and behavioral guidance system (BGS) at Ice Harbor Dam.
- Investigation of feasibility and benefits of installing an RSW and BGS at Lower Monumental Dam.
- Investigation of feasibility and benefits of a forebay physical guidance device at The Dalles Dam and reduction of spill from levels called for in the NOAA Fisheries BiOp.
- Analysis of other Alternatives (*e.g.,* RSW at other projects, extended-length submerged bar screens, bypass and transport system improvements, turbine improvements, etc.) is being conducted in the Major System Improvements Decision Analysis.

## Water management alternatives

- Evaluate the efficiency of the new Bonneville corner collector in assisting passage of the Spring Creek Hatchery release in March.
- Determine a long-term spring and summer operation for the Lower Granite Dam RSW and behavioral guidance device. The 2002 evaluation results showed positive performance of the RSW. Review of 2003 research results is needed to inform the long-term operation.
- Evaluate modified spill pattern at Ice Harbor Dam to reduce injuries and improve spillway survival. Spring spill evaluations in 2003 confirmed previous years' results indicating lower than expected spillway survival at BiOp spill levels, while a summer spill evaluation of an alternative spill pattern indicated the potential to achieve improved spillway survival at NOAA Fisheries BiOp spill levels.
- Determine summer spill operations at John Day Dam. Evaluation results in 2002 indicate a survival advantage to 24-hour spill. Review of 2003 research results is needed to determine future summer spill operations.
- Test alternative nighttime spill levels at John Day Dam in the spring. In 2002, reduced nighttime spill was evaluated. Review of 2003 research results is needed to determine whether to proceed with another year of evaluation.
- Determine spill operations, in combination with the newly constructed second powerhouse corner collector at Bonneville Dam to optimize juvenile and adult passage benefits. Recent years' research results indicate adult fallback may not be affected with levels of spill above the current daytime cap, however, increased spill levels may result in delay of adult passage. Review of 2003 research results is needed.
- Evaluate potential modified summer drafts from Libby and Hungry Horse dams. The Council's mainstem amendments recommend that the benefits to resident fish and impacts to anadromous fish downstream be evaluated. Montana has developed a proposed evaluation, and CBFWA is assessing additional options for such an evaluation.
- An experiment comparing smolt to adult returns of subyearling Chinook passing in-river with spill throughout the system to those transported from Snake River projects (to below Bonneville) is expected in 2006 or later. Preliminary studies are underway.
- Those interested in these additional/modified implementation plan measures are encouraged to participate in the NOAA Fisheries Regional Implementation Forum, including the SCT (for configuration and evaluation alternatives), the TMT (for water management alternatives), the IT and the CBFWA work group. Information on the scope of topics and

contacts for each Regional Forum group is provided in Section 6.0.

### Dry Year Strategy

In response to the low-water year of 2001, BPA drafted a *Guide to Tools and Principles for a Dry Year Strategy.* The draft plan is largely resource focused and does not address an approach to fish operations in low water years. BPA is exploring options for operational flexibility in dry years and intends to propose a suite of dry year fish operations to the region for consideration.

## Hydrosystem Strategy 1: Configure Dam Facilities to Improve Juvenile and Adult Fish Passage and Survival

Much attention has been given over the last decade to improving juvenile and adult passage survival through the complex hydrosystem facilities. Highest priority has been given to defining and installing additional configuration improvements that will raise the passage survival rates at mainstem projects.

To improve juvenile passage survival, the NOAA Fisheries BiOp recommends evaluation and potential construction of configuration improvements such as surface bypass and collection systems, modifications to existing mechanical bypass system, relocation of bypass system outfall pipes, minimum-gap turbine runners and extended length intake screens. We are constantly evaluating the best passage option for each dam to optimize juvenile survival. To improve adult passage survival, the BiOp recommends improving auxiliary water supplies, adult ladder improvements and installing adult PIT detectors to collect information on the use and effectiveness of adult passage facilities. As noted in our progress reports, we are already meeting or exceeding our performance standards for adult passage.

The current suite of configuration projects and their respective details presented in this document for fiscal year 2004 (FY04) and beyond are based on a requested FY04 budget of $98 million and are presented prior to having results of the FY03 research and completion of ongoing priority determinations underway with the SCT. The actual FY04 appropriation has not been established at this writing and final consensus on the priorities will be dependent on that appropriation and, for some measures, FY03 research results. We anticipate completing updated work plans by the end of November 2003, which will incorporate these issues. The updated work plans will be distributed when completed.

Physical improvements to hydroelectric facilities at non-CRFM projects are also recommended in the both the NOAA Fisheries and USFWS BiOps. The Corps implements these improvements (at Libby, Dworshak and Chief Joseph) as funding becomes available.

### Hydrosystem Substrategy 1.1: Mainstem juvenile passage improvement

#### *Five-Year (2004–2008) Outcomes*

Ongoing use of existing fish passage devices, plus the following key juvenile passage enhancement outcomes, are anticipated by 2008:

- Major juvenile fish passage projects called for in the BiOp will be underway or completed by 2008.
- Juvenile passive integrated transponders (PIT) detection systems will be installed and providing data to evaluate the effectiveness of actions and assess progress toward hydrosystem survival performance standards.
- Turbine survival improvement that includes a minimum gap runner installation will be ongoing to improve juvenile fish survival.
- Data from 2001–2005 adult returns will be sufficient to evaluate significance of delayed mortality, if any, from transport and dam passage.
- Prepare comprehensive decision documents for projects with lower than anticipated juvenile passage survival rates (*i.e.,* the Bonneville Decision Document and the Major System Improvements Decision Analysis for Snake River projects).
- Install removable spillway weirs (RSWs) where warranted to increase juvenile survival rates and spill cost-effectiveness. RSWs may also enable reduced total dissolved gases (TDG). RSW's are being evaluated at Ice Harbor, Lower Monumental, Little Goose and McNary Dams.
- A new "fish friendly" prototype turbine will be evaluated at McNary Dam in 2005 and 2006. Depending on the results, new turbines may be installed at McNary Dam. The new turbines would have greater hydraulic capacity that would result in reduced involuntary spill (and TDG levels).
- The Turbine Survival Group will complete their Phase II report and will make recommendations on turbine geometry and operational flow levels that provide turbine passage survival.
- Spillway modifications will be evaluated for effects on fish passage survival at The Dalles Dam.
- A design for a Snake River summer spill evaluation that

compares in-river summer spill passage with transportation survival will be developed.

- The Major Systems Improvement Decision Analysis will be complete and preferred alternatives will implemented as determined through the regional prioritization process.

### *2004 Work Plan*

Juvenile passage projects that will be worked on in 2004 are listed below. Individual project work plans are listed in more detail in Appendix A.

#### Bonneville Dam

- Flat plate juvenile PIT-tag detector–continue operation.
- 1st powerhouse fish guidance efficiency improvements–testing with new prototype porosity plate.
- 1st powerhouse surface bypass–remove prototype powerhouse surface collector.
- 1st powerhouse juvenile bypass system (JBS) improvements–prepare construction plans and specifications.
- 2nd powerhouse surface bypass (corner collector)–complete construction and study project fish passage efficiency and survival during collector operation.
- 2nd powerhouse fish guidance efficiency improvements–continue evaluations, resolve gap loss issue, potential final prototype tests.
- 2nd powerhouse JBS improvements–complete follow-on improvements.

#### The Dalles Dam

- Sluiceway outfall and emergency auxiliary water system–defer action on this measure.
- Surface bypass/forebay guidance–conduct forebay fish distribution and behavior studies, initiate forebay guidance device investigations and development.
- Spillway improvements - complete spillwall construction, continue follow-on spillway improvement evaluations.
- The Dalles decision framework - continue comprehensive options analysis for final configuration/operation of the project for juvenile passage.

#### John Day Dam

- Extended-length Submerged Bar Screen (ESBS)–complete prototype testing.
- John Day surface bypass/decision document–initiate evaluation of alternative final configuration/operation of the project for juvenile passage.

#### McNary Dam

- Forebay debris control–complete design for debris removal craft.
- ESBS improvements–complete improvements.
- Spillway gates and hoists–initiate repairs to allow for operation of all spill bays for juvenile spill patterns.
- Evaluate juvenile turbine passage survival through turbines to determine safe operating parameters relative to the 1% peak efficiency criterion.

#### Ice Harbor Dam

- RSW–complete design, plans and specifications and decision to proceed with construction.
- PIT-tag detection on main transport flume–initiate design.

#### Lower Monumental Dam

- JBS outfall relocation and divider wall–complete modeling and technical report.
- PIT-tag detection on main transport flume–initiate/complete design and construction.
- RSW and behavioral guidance device–initiate investigations.

#### Little Goose Dam

- ESBS improvements–complete improvements.

#### Lower Granite Dam

- ESBS improvements–complete improvements.

#### System

- Lower Snake River JBS improvements–complete initial evaluation report.
- McNary/Lower Snake River–complete Major System Improvement Decision Analysis.

### *2005–2008 Work Plan*

Actions planned at these dams in 2005–2008, subject to receipt of FY04 and outyear funding, include the following:

#### Bonneville

- Complete decision on 1st powerhouse configuration, construct improvements if warranted.
- Complete improvements to 2nd powerhouse fish guidance efficiency (FGE).

#### The Dalles

- Configuration decisions.
- Complete construction of sluiceway outfall relocation

(tentative pending study results).

John Day
- Configuration decisions.
- Complete extended screen construction (tentative pending study results).

McNary
- Juvenile facility improvements at collector projects.
- Repair all spill gates and hoists.
- Construct spill divider wall (tentative pending study results).
- Implement preferred alternatives developed in the Major System Improvements Decision Analysis.

Ice Harbor
- Complete construction of RSW and construct BGS (tentative pending study results).
- Implement preferred alternatives developed in the Major System Improvements Decision Analysis.

Lower Monumental
- Outfall relocation and divider wall construction (tentative pending study results).
- Construct RSW and BGS (tentative pending study results).
- Juvenile facility improvements at collector projects.
- Implement preferred alternatives developed in the Major System Improvements Decision Analysis.

Little Goose
- Additional flow deflectors and spill divider wall (tentative pending study results).
- Juvenile facility improvements at collector projects.
- Construct RSW and BGS (tentative pending study results).

Lower Granite
- JBS improvements.
- Construct permanent BGS (tentative pending study results).
- Juvenile facility improvements at collector projects.
- Implement preferred alternatives developed in the Major System Improvements Decision Analysis.

### *Regional Coordination*

The Corps, in coordination with the SCT, develops priorities for the FY04 CRFM program. Related RM&E activities are developed through the Corps' Anadromous Fish Evaluation Program (AFEP).

## Hydrosystem Substrategy 1.2: Mainstem adult passage improvement

### *Five-Year (2004–2008) Outcomes*

A number of CRFM measures provide for improvements to adult passage facilities at the mainstem projects. Generally the adult measures are directed at investigation and potential correction of conditions that may delay adult migration or that improve the passage facilities and assure their serviceability and reliability. The following key outcomes are expected by 2008:
- Adult PIT-detection systems will be installed and operational.
- Adult fallback studies are complete and configuration changes needed to minimize fallback at Bonneville and McNary are installed or under construction if required.
- Fish ladder and transitional pool dynamics are better understood and methods to remove passage delay are implemented.
- Adult passage facility auxiliary water supply improvements are installed or under construction.

### *2004 Work Plan*

Adult passage projects that will be worked on in 2004 are listed below.

Bonneville Dam
- Adult PIT-tag detector–complete modifications to system.
- 2nd powerhouse fish unit trash rake–complete construction.

The Dalles Dam
- Emergency auxiliary water supply–defer actions to complete reanalysis, update design report and make decision to proceed.

John Day Dam
- Adult PIT-tag detector–initiate evaluations and design.
- North shore auxiliary water supply system–complete design report.
- Ladder water temperature–no actions planned in FY04.

### *2005–2008 Work Plan*

Installation of adult PIT-tag detection systems will continue at The Dalles, John Day, Little Goose and Lower Monumental dams. Auxiliary water supply modifications will be completed at priority mainstem dams. Based on adult

fallback studies at Bonneville, McNary and Snake River dams, actions to minimize fallback will be developed and implemented.

### *Regional Coordination*

The Corps, in coordination with the SCT, develops priorities for the FY04 CRFM program. Related RM&E activities are developed through the AFEP.

## Hydrosystem Substrategy 1.3: Measures that address temperature and dissolved gas

### *Five-Year (2004–2008) Outcomes*

The Action Agencies, other federal agencies, states and tribes have undertaken a comprehensive water-quality planning effort to address water quality in the mainstem Columbia and Snake rivers. A 2003 Columbia/Snake River Mainstem System Water Quality Plan as described in Appendix B of the NOAA Fisheries 2000 BiOp was completed in April 2003. The 2003 Water Quality Plan will be updated in 2004. Within the CRFM program, several measures are planned to continue to address dissolved gas and temperature issues affecting fish passage and survival at various projects.

The following key outcomes are expected by 2008:

- The Action Agencies will continue to implement feasible actions identified in a comprehensive Columbia/Snake River water quality plan that will make further progress towards meeting water quality standards. The Action Agencies will revise that plan as appropriate.
- Spillway modifications (*e.g.,* deflectors and training walls) intended to reduce total dissolved gas (TDG) levels and improve juvenile fish survival at mainstem dams will be complete or under construction. This will result in higher fish survival and more efficient spill operations.
- Measures to understand water temperature related problems will continue.
- Water quality actions for tributaries are covered in Section 5.2 of this plan.

### *2004 Work Plan*

Priorities for 2004 actions focus on TDG and water temperature. Spillway improvements at Snake River projects and The Dalles Dam (including evaluation of training walls) will continue to be developed, and spill survival issues will continue to be investigated at The Dalles. With regard to water temperature, investigations of ladder temperature effects on adult passage will continue at Snake River projects and at John Day Dam. A study of McNary forebay temperature effects on juvenile passage facilities will continue and an evaluation of Dworshak Dam operations to improve Snake River water temperatures will continue.

Water quality projects that will be worked on in 2004 are listed below. Individual project work plans are developed in coordination with the NOAA Fisheries Regional Implementation Forum's Water Quality Team (WQT) and SCT.

#### Bonneville Dam

- Spillway deflectors (gas fast track)–complete decision on additional bays, initiate construction (tentative).

#### The Dalles Dam

- Spillway deflectors (gas fast track)–complete alternatives analysis (tentative).

#### John Day Dam

- Spillway deflectors (gas fast track)–no work scheduled.

#### McNary Dam

- Forebay temperature improvements–continue Computational Fluid Dynamics (CFD) model study.
- Spillway divider wall–continue evaluations.

#### Little Goose Dam

- Flow deflectors and divider wall–complete model studies and divider wall technical report.

#### Lower Granite Dam

- Flow deflectors and divider wall–initiate model studies and field total dissolved gas testing.

#### Dworshak Dam

- Dworshak National Fish Hatchery water supply reuse (system 1)–finish construction of phase 1 and phase 2 modifications.
- Dissolved gas abatement–initiate report.

#### System

- Forebay monitors review (Lower Granite to McNary)–begin field investigations and analysis and identify recommended site locations.
- Redundant TDG monitors (Dworshak to McNary)–procure additional TDG monitoring instruments and physical infrastructure modifications.
- Water temperature modeling plan alternative study–Phase 1 plan development, final report.
- Mainstem Columbia and Snake River Water Quality Plan–regional coordination and plan development.

### *2005–2008 Work Plan*

Spillway deflectors and other modifications (*e.g.,* training walls) will be installed at all FCRPS projects, as warranted, and at Chief Joseph to minimize spill-caused total dissolved gas saturation. RSW effects on TDG will be understood, and RSWs will be installed or under construction at appropriate sites. A Mainstem Columbia and Snake River Water Quality Plan will be completed.

### *Regional Coordination*

The Action Agencies, other federal agencies, states and tribes have begun discussions on a comprehensive water-quality planning effort to address water quality in the mainstem Columbia and Snake rivers. A Water Quality Plan development group is building off of the states Total Maximum Daily Load (TMDL) process for TDG and water temperature in the mainstem Columbia and the Council's Mainstem/Systemwide Water Quality Program Summary. The goal is to develop the Columbia/Snake River Mainstem System Water Quality Plan as described in Appendix B of the NOAA Fisheries 2000 Biological Opinion.

## Hydrosystem Substrategy 1.4: Project configuration RM&E

### *Five-Year (2004–2008) Outcomes*

RM&E for configuration and operations and maintenance (O&M) activities is intended to provide information necessary to design, build/modify and operate fish passage facilities, provide baseline information on passage efficiencies and survival through past projects, and post-construction evaluation of new or modified passage facilities. Data from RM&E efforts will also be used in determining success in meeting performance standards (see more detail in section 5.6 RM&E Priorities). The following key outcomes are expected by 2008:

- Data from 2001–2007 spring Chinook and steelhead adult returns will be sufficient to better establish the relationship of differential mortality to environmental and operational conditions.
- Causes of juvenile mortality through projects (*e.g.,* The Dalles and John Day dams) and all routes of juvenile passage will be identified and options to minimize mortality are identified and/or under construction.
- RSWs will be evaluated to determine their influence on juvenile fish passage survival, TDG and potential for reducing spill volumes.
- Adult head burn causes will be identified and methods to minimize head burn will be defined and implemented.
- Mechanical bypass system modifications will be evaluated for passage survival in relation to total project survival.
- Optimum spill configuration and project operations will be defined and implemented at Bonneville, The Dalles, John Day, McNary, Ice Harbor and Lower Granite dams.

### *2004 Work Plan*

Configuration RM&E plans for 2004 are listed below. Individual work plans for RM&E projects are developed through AFEP and in coordination with the SCT. More detailed plan descriptions are included in Appendix A.

#### Bonneville Dam

- Juvenile fish studies–estimate total project and route-specific survival and fish passage efficiency for the new Bonneville 2nd powerhouse corner collector, Bonneville 2nd powerhouse juvenile bypass system, spillway, 1st powerhouse sluiceway and new minimum gap runners for spring and summer outmigrants.
- Adult fallback–final year of delay and adult fallback evaluation.
- Adult lamprey passage–continue evaluation of new passage system for adult lamprey.
- 2nd powerhouse FGE–Evaluate submersible traveling screens (STSs) improvements and determine appropriate level of implementation.

#### The Dalles Dam

- Project survival study–characterize stilling basin hydraulic conditions, estimate direct plus indirect survival and injury rates, and estimate juvenile fish travel paths through the stilling basin. Evaluate fish passage efficiency for all routes of juvenile passage.
- Evaluate behavior of fish in the forebay of The Dalles Dam. The intent of this study is to evaluate the feasibility of a physical guidance device for the forebay and to assist in design of the device to improve fish passage efficiency.
- Evaluate adult delay and fallback with new spill patterns developed with respect to the installation of the spillway training wall.
- Evaluate the prominence of smallmouth bass in the tailrace of The Dalles and develop means to reduce the potential for predation on juvenile salmonids.

#### John Day Dam

- Spillway survival and passage efficiency–estimate project and route specific survival rates, fish passage efficiency and spill passage efficiency, forebay retention time and

tailrace egress for juvenile passing through John Day Dam. This study is contingent on 2003 results.

- Evaluate adult holding and jumping in the John Day south ladder in relation to improvements in the exit control section implemented in 2003.
- Initiate project configuration study to evaluate alternatives for implementation.
- Evaluate juvenile survival and descaling with new VBS design.

### McNary Dam

- Juvenile survival–estimate project and route specific survival rates.
- Juvenile fish transportation evaluation–spring/summer Chinook and steelhead evaluations.
- New turbine study–complete evaluation of turbine passage survival for new turbine design and make decisions on future turbine replacements.

### Ice Harbor Dam

- Separator evaluation–evaluate high velocity flume with high fish densities.
- Juvenile fish survival evaluation–optimize spillway and project survival.
- Spill bay injury evaluations.
- Assuming that the preliminary 2003 research results for the Lower Granite RSW hold true, a contract for construction of an RSW at Ice Harbor would be awarded early in FY04 to enable its completion and operation in 2005.

### Lower Monumental Dam

- Spillway efficiency/survival study

### Lower Granite Dam

- Surface bypass and collection–evaluate RSW with BGS installed.
- Fish ladder transition pool evaluation–complete final report, decision to construct permanent raised weirs.
- Adult salmonids water temperature studies — passage and behavior.

### System

- Turbine passage survival study–complete second Bonneville minimum gap runner (MGR) test to evaluate best operating condition for Bonneville first powerhouse. Initiate phase 2 of the Turbine Survival Program to develop a strategy for rehabilitation of existing turbine units, develop turbine operating guidelines to improve fish survival and conduct studies to support Ice Harbor turbine replacement.
- Adult migration studies–continue adult passage telemetry to evaluate adult survival through the hydrosystem including assessment of straying and unaccounted loss. Analysis will provide information necessary to assess the adult PIT-tag passage indices. Finalize head burn studies.
- Adult temperature evaluation–report on effects between McNary and Lower Granite.
- Fish ladder temperature evaluation–complete summary report.
- Multiple bypass study–data review report for study completion (comparative survival, differential recovery, physiological differences, bypass vs. undetected, guided vs. unguided and pathogens).
- Avian predation study–PIT-tag recovery on bird colonies. Continue study with increased emphasis on inland colonies and development of management alternatives to reduce predation in these locales.
- Estuary studies–evaluate salmonid estuary and plume use and influences of the hydrosystem flows. Continue development and implement new acoustic tag and detections system to partition losses of juvenile salmonids below Bonneville Dam.
- Kelt research–evaluate project passage, transportation, returns and long-term survival of steelhead in the lower Columbia.
- Marine mammal monitoring–Complete evaluation on the effects of sea lions on adult salmonids immediately below Bonneville Dam.
- High flow juvenile PIT-tag system–evaluate potential system to improve precision of reach survival estimates during high flow conditions from McNary through Bonneville dams.
- Evaluate the potential improvements to juvenile pit tag detections associated with high volume flumes (*i.e.,* Bonneville corner collector). Evaluate the behavior of juvenile fish with different entrance designs (*i.e.,* The Dalles sluiceway, Bonneville corner collector, Lower Granite RSW).

### *2005–2008 Work Plan*

Many of the above studies will continue throughout the 2005–2008 time period. It is anticipated that these studies may provide additional information for future configuration or operational changes to improve passage survival rates. It is

expected that PIT-tag detection systems for both juveniles and adults will have been developed and installed by 2005 to enable passage survival rates to be quantitatively calculated for the 2008 check-in. Adult return data during the 2004–2007 timeframe should be used to verify/establish the delayed system mortality rate for spring/summer Chinook and steelhead.

### *Regional Coordination*

Development and coordination of the Corps RM&E program is through AFEP. Priorities and technical peer review occurs in a technical work group (Studies Review Work Group–SRWG) and coordination for funding priority occurs with the SCT. Activities will also be coordinated with the Action Agencies' RM&E program (see section 5.6) that will interface with other regional RM&E processes (*e.g.,* TRT and Council's subbasin planning process).

## Hydrosystem Strategy 2: Manage Water to Improve Juvenile and Adult Fish Survival

The Action Agencies' goal for 2004–2008 is to implement water management measures consistent with other project purposes and available water supply. These measures include system flow objectives for juvenile fish migration, reservoir operations to help meet needs of fish at or near the project, spill for juvenile fish passage and other aspects of water management.

Each year, the Action Agencies manage a varying amount of natural flow that enters the FCRPS as runoff from precipitation and melting snowpack. This water is used to meet multiple purposes, including irrigation, flood control, power production, fish recovery, navigation and recreation. The Action Agencies expect to implement most of the water-management measures for fish survival in the BiOps under most water conditions. Where conflicts occur between BiOp measures, the Action Agencies plan to resolve them using the priorities recommended in the BiOps. Some detail on these priorities is discussed in the following substrategy discussions. Additional detail will be available in the annual and five-year Water Management Plans (WMP).

The one-year implementation plan and the WMP are prepared when little is known about the actual water supply conditions to be experienced in an upcoming year. Therefore, the Action Agencies will develop detailed seasonal updates (fall/winter and spring/summer) to the WMP to better reflect priorities based on actual and anticipated water conditions. The implementation of water management measures is accomplished through in-season operations coordinated through the TMT. The 2003 WMP and seasonal updates are posted on the TMT Web site at http://www.nwd-wc.usace.army.mil/TMThttp://www.nwd-wc.usace.army.mil/TMT/index.html.

### Hydrosystem Substrategy 2.1: Reservoir operations to improve fish survival

#### *Five-Year (2004–2008) Outcomes*

The Action Agencies will annually implement several independent FCRPS project operations to benefit fish at or near a given project or its reservoir. These reservoir operations vary by project. The Action Agencies expect the following key outcomes:

- Project outflows will provide minimum recommended flows for listed resident fish.
- Outflow fluctuations will be limited to avoid stranding fish.
- Lower Snake River reservoirs will be maintained at or above their minimum operating pool (MOP) and John Day reservoir near its minimum irrigation pool to reduce cross-sectional area and help speed juvenile passage.
- Temperature of water releases will be regulated to improve water temperatures for fish as feasible.

These operations are generally the highest priority, not likely to change from the BiOp recommendations and are generally complementary to system requirements. The Action Agencies will consider and coordinate any potential changes through the TMT process.

The annual and five-year Water Management Plans are the work plan for this substrategy. These work plans are located at http://www.nwd-wc.usace.army.mil/TMT/index.html.

#### *2004 Work Plan*

The key actions in this substrategy include the following:

Libby Dam

- Maintain minimum outflows for bull trout.
- Provide flows for Kootenai River white sturgeon spawning/recruitment.
- Regulate outflow temperatures to meet local resident fish needs.
- Maintain outflow changes within hourly and daily change recommendations issued by USFWS.

Hungry Horse Dam

- Maintain minimum outflows from the dam and at Columbia Falls gage for bull trout.
- Regulate outflow temperatures to meet local resident fish needs.

- Maintain outflow changes within hourly and daily change recommendations issued by USFWS.

Dworshak

- Maintain minimum outflows from the dam for resident fish and regulate outflow temperatures to meet salmon and steelhead needs in the lower Snake River.
- If conditions allow, conduct September operations to duplicate studies to provide up to 200 kaf without drafting below the 1,520-ft elevation.

Lower Snake River Projects and John Day

- Maintain forebays at or above the minimum operating pool from April 10 through September 30 to increase water velocities during juvenile fish migration.

### *2005–2008 Work Plan*

The Action Agencies expect to repeat activities in the 2004 work plan annually for the foreseeable future. No significant additional actions are expected to be implemented during this time period unless new information becomes available that indicates changes would be beneficial to listed species with acceptable impacts to other uses.

### *Regional Coordination*

The principal forum for these water management actions is the NOAA Fisheries Regional Forum (TMT and the IT).

## Hydrosystem Substrategy 2.2: System flow management to improve fish survival

### *Five-Year (2005–2008) Outcomes*

The Action Agencies will annually provide coordinated water releases from the FCRPS storage projects for system purposes, to provide mainstem flow augmentation and improve system water quality. The Agencies have developed the following BiOp-based priorities (in order) for flow management:

- Operate reservoirs to meet independent reservoir operation objectives from Hydrosystem Substrategy 2.1.
- Operate storage projects to be at their April 10 flood control elevation to increase flows for spring flow management.
- Refill the storage projects by approximately June 30 to provide summer flow augmentation.
- Provide fall and winter tailwater elevations/flows for chum salmon spawning and incubation.
- Provide increased spring flows in the Kootenai River below Libby Dam to evaluate if this will induce natural spawning by Kootenai River White Sturgeon. If confirmed, the Action Agencies will develop a plan to enable increased flows from Libby within total dissolved gas standards.

The Action Agencies expect the following outcomes to be achieved annually:

- Available storage will be used to augment juvenile migration flows, although seasonal flow objectives will not be met in all years at all times during migration season.
- Adult and juvenile mainstem passage survival performance standards will be met.
- Depending on actual runoff conditions and in-season fish requirements, consider conducting September operations at Dworshak to duplicate the 2002 study to provide up to 200 kaf of volume, without drafting below 1,520 feet elevation, for improving adult survival in the Snake River.

The Action Agencies recognize that flow management measures of this substrategy are but one component of meeting passage survival standards. Other measures, such as juvenile passage spill, predation control, transportation and natural flows, will also contribute.

### *2004 Work Plan*

The current version of the WMP provides details for this flow management strategy. The Action Agencies plan to annually implement this plan in consideration of varying annual water supply, fish migration timing and other authorized system uses, including power production, flood control, irrigation, navigation and recreation.

In an operating year that begins on October 1, flow needs are not encountered in the same order as the priorities, *i.e.,* the first decision to be made is for chum salmon spawning flows, which have a lower priority than summer flows. Therefore, chronologically, the Action Agencies will attempt to operate during the year as follows:

- **The initial objective** will be to operate the storage reservoirs (Dworshak, Hungry Horse, Libby, Albeni Falls and Grand Coulee) to be at flood control levels by early April. This level varies with runoff forecast. The ability to reach early April flood control levels will be affected by how much water was released for flood control, power generation, minimum flow requirements below the project and fishery flows to support both chum and Hanford reach spawning. There may be years when chum and Hanford Reach flows may need to be reduced to be at the early April flood control levels.
- **The next objective** is to refill the storage reservoirs to full by about June 30 to maximize available water storage to benefit summer migrants. The June 30 refill would have priority over spring (April, May, June) flow objectives although there would be an attempt to meet the spring

targets and other fish needs. Nevertheless, to meet the requirements of the USFWS BiOp, minimum flows for resident fish below some projects would have priority over refill.

- **The final objective** is management of available storage to augment summer (July, August) flows to achieve flow objectives and for water temperature control. The storage reservoirs will be drafted to their specified August 31 draft limits to augment summer flows. These limits would have a higher priority over the summer flow objectives in order to meet other project uses and reserve water in storage for 2004. The August 31 limits are elevation 2,439 feet at Libby (20 feet from full), 3,540 feet at Hungry Horse (20 feet from full), 1,280 feet at Grand Coulee in above average water conditions (10 feet from full), 1,278 feet at Grand Coulee in below average water conditions (12 feet from full) and 1,520 feet at Dworshak (80 feet from full).

The Action Agencies will balance these fish measures with other system needs and will seek and coordinate a balance through the TMT process.

The annual WMP is the work plan for this substrategy. It is prepared by the Action Agencies in coordination with the NOAA Fisheries Regional Implementation Forum. The action agencies annually coordinate WMP preparation in the TMT by submitting a first draft and taking TMT advice and comments prior to preparing a final plan that is posted on the TMT Web site (http://www.nwd-wc.usace.army.mil/TMT/index.html). Seasonal updates are developed to reflect changing water supply forecasts, actual stream flows and other factors.

### *2005–2008 Work Plan*

The Action Agencies expect to repeat the activities in the 2004 work plan annually for the foreseeable future. No significant additional actions are expected to be implemented during this time period unless new information becomes available that indicates changes that would be beneficial to listed species with acceptable impacts to other uses.

### *Regional Coordination*

The principal forum for these water management actions is the NOAA Fisheries Regional Forum (TMT and IT).

## Hydrosystem Substrategy 2.3: Spill operations for project passage

### *Five-Year (2004–2008) Outcomes*

This substrategy includes spill at certain FCRPS projects, depending on runoff conditions, to provide better project passage for juvenile fish while avoiding high TDG supersaturation levels or adult fallback problems. Four general areas contribute to establishing spill priorities:

1. **Spread the Risk.** Spill is provided at both transport and non-transport projects to "spread the risk" between transportation and in-river migration under average or above-average spring runoff conditions. Spill is provided only at non-transport projects to enable maximum transportation under low-flow conditions and during the summer outmigration.
2. **Dissolved gas management.** Specific spill levels for juvenile fish passage are provided at each project, not to exceed established TDG levels (either the 110 percent standard, or as modified by state water quality waivers to 120 percent). Additionally, spill is managed on a system basis according to a priority list to distribute spill across the region in high runoff conditions to prevent dissolved gas supersaturation "hotspots."
3. **Adult salmon fallback.** Spill for juvenile fish passage is also limited at Bonneville and Ice Harbor Dam to reduce adult fish fallback over the spillways.
4. **Passage survival research.** Spill-related research priorities include evaluation of juvenile passage survival, spill effectiveness in relation to spill levels and duration, effect of spill on juvenile fish retention in forebays and tailraces, tailrace egress and effect of spill on adult fallback. In some cases, normal spill operations may be modified to support such research. A major action during this implementation period will be focused on developing optimal spill operations for summer migrants from the Snake River in support of the comparative transportation survival studies.

The Five-Year WMP, prepared by the Action Agencies through the NOAA Fisheries Regional Implementation Forum, is the work plan for this substrategy.

### *2004 Work Plan*

The Action Agencies intend to provide spill for juvenile fish passage at the FCRPS projects according to the schedules and spill amounts (except where they have been modified based on new information) identified in the NOAA Fisheries BiOp, which incorporates Table III-2 of the 1998 Supplemental Biological Opinion and in accordance with the spill priorities discussed above.

The results of 2003 spill optimization research plans will be presented in November, and 2004 operational tests will not be finalized before December 2004. Those with an interest are urged to participate in Fish Facilities Design Review Workgroup (FFDRWG) and Studies Review Workgroup meeting where 2004 research planning and design occur.

Survival research at Ice Harbor, McNary, The Dalles and Bonneville dams are expected to receive highest priority in 2004.

In addition, as described in section 5.1, there are regional efforts underway to assess summer spill evaluations and management options. The outcome of these efforts may affect 2004 summer spill operations.

The 2004 Water Management Plan (WMP) describing normal hydro operations is completed coincident with this Implementation Plan. The W M P is updated in both the fall and spring each year. Copies of these documents are available on the TMT website at http://www.nwd-wc.usace.army.mil/TMT/.

### *2005–2008 Work Plan*

A 2004–2008 Water Management Plan (Five-Year WMP) is being prepared and should be issued coincident with this Implementation Plan and the 2004 WMP. The Five-Year WMP identifies possible new river operations based on research and policy initiatives in the region and will be posted on the TMT website at http://www.nwd-wc.usace.army.mil/TMT/.

Unless new hydrosystem operations are developed that improve passage survival or achieve equal benefits in a more cost effective manner, the Action Agencies expect to repeat the activities in the 2004 work plan annually for the foreseeable future. The exception to this would be new operations necessitated by configuration changes or research initiatives. Examples are:

- Establishment of a long-term operation for the new Lower Granite RSW.
- Development of a long-term operation (begin and end dates) for the new Bonneville second powerhouse corner collector based on operational tests.
- Evaluation of summer spill operations to determine if the biological objectives of the BiOp can be achieved at lower cost, as recommended by the Council, will be developed and implemented if feasible. Revised project operations will be established if study results warrant it.
- Evaluation of summer reservoir operations at Libby and Hungry Horse, as recommended by the Council, to assess benefits to resident fish needs. Based on study findings a long-term summer reservoir operation would be developed for these sites.
- Conduct research and implement actions to reduce juvenile migrant predation in the mainstem reservoirs.

### *Regional Coordination*

The principal forum for these water management actions is the NOAA Fisheries Regional Forum (TMT, IT and the WQT). Spill-related research occurs under the AFEP process.

## Hydrosystem Substrategy 2.4: Transmission reinforcements in support of flexibility for river operations

Transmission capacity in many areas within the FCRPS service area is currently fully allocated and often constrained. Spring river operations (high flows) have a correspondingly high need for transmission capacity to deliver the electricity to often-remote markets. Spill operations are influenced by available transmission capacity during both spring and summer. The NOAA Fisheries and USFWS BiOps identify some of these transmission constraints, which at times pose limitations on operational flexibility. The BiOps recommend several actions to study and/or reinforce the transmission system to enable greater flexibility for implementation of the spill and flow management actions. The Action Agencies are preparing, or have completed, the environmental analysis needed to support transmission reinforcement decisions.

### *Five-Year (2004–2008) Outcomes*

Several transmission system improvements are being evaluated and implemented to increase operational flexibility for implementation of fishery operations.

### *2004 Work Plan*

- BPA's Schultz-Wautoma 500-kV Transmission Line Project (formerly known as "Schultz-Hanford") is required to provide future flexibility of the transmission system. The final environmental impact statement (EIS) and Record of Decision (ROD) were issued in 2003. Energization of the new Schultz-Wautoma 500-kilovolt transmission line has been delayed because of BPA's capital funding constraints. While construction on some elements of the project began in May 2003, major line construction is now scheduled to start in the fall 2004, be completed by winter 2005 and energized by spring 2006. This project is in response to RPA Action 55.
- BPA's Grand Coulee-Bell 500-kV Transmission Line Project is required to improve the transfer limitations from Montana. The final EIS was released in December 2002 and the ROD was issued in January 2003. Construction of the line began that month and energization is expected in November 2004. This project is in response to RPA Action 56.
- BPA's Transmission Business Line will continue developing new transmission plans to integrate generation

from a number of planned energy resources in the Pacific Northwest. One example is the new 75-mile 500-kV transmission line from McNary Dam to John Day Dam to integrate the new Wallula generating project. The Final EIS on this project was released February 2002 and the ROD in October 2002. Construction is contingent upon the generation developers signing a long-term transmission agreement. This project is on hold until financing is secured. Several other studies of new generating resources are also being undertaken in 2004. This project is in response to RPA Action 57.

### *2005–2008 Work Plan*

Transmission capacity out of the Kootenai/Flathead River Valleys is currently limited. This condition became worse when the Columbia Falls Aluminum plant stopped production. The maximum generation in the combined Hungry Horse and Libby area that can be simultaneously run depends on the area load and may have to be reduced to meet certain operating conditions. Also, minimum generation levels are required at Hungry Horse whenever lightning storms occur in the area (which could cause the two major lines into the area to be removed from service). Sufficient generation is needed to serve local loads within the limitations of the remaining line. The shutdown of the Columbia Falls Aluminum plant actually improved this situation, as there is now less demand in the valley. A study is underway to investigate the costs and feasibility of options to mitigate the generation adjustments that are required to reliably operate the area system. Construction of additional transmission as well as other technical or operational solutions will be considered. These studies will be concluding by December 2003.

### *Regional Coordination*

National Environmental Policy Act (NEPA) environmental review processes

## Hydrosystem Substrategy 2.5: Other actions to enhance water management

### *Five-Year (2004–2008) Outcomes*

This hydrosystem substrategy includes several independent water management–related measures with potential to improve fish survival. Key outcomes expected include:

- The Corps and Reclamation will complete the VarQ NEPA studies and Reclamation will complete the Banks Lake Drawdown EIS and make decisions concerning operation of the affected projects.
- Reclamation will complete ESA consultations on its projects below Chief Joseph Dam. This may contribute to increased fish survival in several major tributaries.
- Reclamation will complete and/or continue several ongoing activities that may improve fish survival. These include water conservation projects, water quality monitoring of the Columbia Basin Project return flows, resolution of unauthorized water usage cases, acquisition of water for flow augmentation from Reclamation's Snake River basin projects.

### *2004 Work Plan*

Key activities planned in 2004 include the following:

- **VarQ.** Reclamation will continue to operate Hungry Horse on an interim basis using VarQ criteria. The Corps initiated interim implementation of VarQ at Libby beginning in 2003 after completing an Environmental Assessment the end of December 2002 and will operate to VarQ in 2004 while continuing work on the EIS for long-term implementation.
- **Banks Lake Drawdown.** Reclamation will complete an assessment of the impacts of drafting Banks Lake an additional five feet for summer flow augmentation in 2004.
- **Reclamation ESA consultations.** Consultations with NOAA Fisheries and USFWS will be completed in 2004 for the Yakima, Umatilla, Deschutes and Tualatin projects. The biological assessments for Yakima and Umatilla are complete, and the biological assessment for Deschutes was completed in September 2003. The BiOps for these three projects are scheduled for completion by January 2004.
- **Reclamation water-conservation projects.** Reclamation will work in partnership with willing irrigation districts to cost share conservation projects under the Water Conservation Field Services Program. Projects are selected from numerous proposals received from irrigation districts, canal companies and others and must meet defined selection criteria. Those criteria include the potential to benefit ESA-listed fish species.
- **Reclamation report on unauthorized water use.** Reclamation completed this report and submitted it to NOAA Fisheries in March 2003. Reclamation will continue its work to resolve specific issues with districts and their water users.
- **Water acquisition from Reclamation's Upper Snake River Projects.** Reclamation, NOAA Fisheries and others are participating in settlement discussions under the Snake River Basin Adjudication (SRBA). In the interim,

Reclamation will continue to pursue purchase of water from storage in the Snake River in 2004 to provide flow augmentation to benefit summer migrants at a targeted amount of 427,000 acre-feet. The actual amount will depend on available water supply from storage and natural flows and the willingness of sellers. Reclamation has reinitiated Section 7 consultation under ESA for its Upper Snake projects. The biological assessment is scheduled for completion in June 2004 with a biological opinion to be completed by November 2004.

- **Columbia Basin Project water quality monitoring.** Reclamation will continue water quality monitoring and evaluation of return flows.

### *2005–2008 Work Plan*

- **VarQ.** The Corps and Reclamation will complete the EIS and issue RODs on long-term implementation by 2005.
- **Reclamation activities.** Reclamation will continue working with irrigation districts under ongoing programs for water conservation, resolution of unauthorized use, Snake River water acquisition and water quality monitoring.
- **System flood control.** Comprehensive evaluation of current system flood control requirements expected to be initiated pending funding appropriations. This would evaluate current basin flood control regulations and provide for additional flexibility to provide for increased spring migration flow augmentation.

### *Regional Coordination*

The Upper Columbia EIS and Banks Lake Drawdown EIS are being conducted under NEPA and are open to public participation. The Snake River Basin Adjudication settlement discussions are a legal process open only to parties in the adjudication. The NOAA Fisheries Regional Implementation Forums (IT) is the most convenient forum for obtaining information on the remainder of the activities in this substrategy.

## Hydrosystem Strategy 3: Operate and Maintain Fish Passage Facilities to Improve Fish Survival

Anadromous fish passage facilities, such as fish ladders and bypasses and/or mitigation hatcheries, were provided at the time many FCRPS projects were built. The original facilities have been updated and new facilities, such as bypass systems, collection and transport facilities, PIT-tag detection systems and TDG monitoring equipment, have been added at the dams. The Corps District Offices in Seattle, Walla Walla and Portland coordinate O&M activities at the dams. Each dam has a staff to carry out day-to-day O&M requirements. The Fish Passage Operations and Maintenance Team (FPOM) develop operational priorities and operating criteria that are summarized in the Fish Passage Plan. This plan is updated annually and implemented by project personnel and others involved with river operations. It can be referenced at http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/fpp2002.pdf.

O&M tasks are categorized and implemented as follows: routine O&M; non-routine O&M that includes capital improvements; juvenile fish transportation; and operations RM&E. Plans for each of these O&M substrategies are described below.

### *Five-Year (2004–2008) Outcomes*

The following O&M outcomes and priorities are expected during the next five years:

- Capital improvements critical to assure continual reliability and/or performance of fish passage facilities are prioritized and implementation has begun.
- The juvenile fish transportation program is conducted in accordance with the BiOps and decreased reliance on truck transport has been maintained as a result of extended barging periods.
- Fish passage system reliability has been increased and projected outage times have been decreased due to the acquisition of critical spare parts.
- The backlog of deferred maintenance has been reduced within funding capabilities. Emphasis has been placed on those facilities identified as highest risk.
- All routine O&M activities necessary to assure that fish facilities operate properly will be implemented.

### Hydrosystem Substrategy 3.1: Operation and maintenance of FCRPS fish facilities

### *2004 Work Plan*

The following routine operations and maintenance activities are planned at each of the FCRPS dams:

**Operate fish passage facilities**

- Daily operations
- Facility inspections, including cleaning and minor facility adjustments
- Calibration of control equipment
- Fish biologist oversight
- Fish counting

**Maintain fish passage facilities**

- Annual maintenance of fish screens

- Fish bypass systems
- Adult fish ladders
- Powerhouse collection systems
- Adult fish pumps

**Debris control**

- Investigation and implementation of methods to improve debris handling and removal

**O&M of mitigation fish hatcheries**

- Facility O&M funding
- Provide electrical power for hatchery operations
- Maintenance support

**Avian predation**

- Contract with USDA to discourage avian predation at projects.

**Fish Passage Plan**

- Annual update and implementation

### *2005–2008 Work Plan*

Routine O&M work in 2005–2008 will be comparable to that described for 2004. Preventative maintenance programs would be developed for additional projects. Additional spare parts will be acquired to assure the reliability of critical passage systems. O&M staff will support RM&E studies at many of the projects.

### *Regional Coordination*

Fish facility O&M activities are coordinated with the region through the FPOM and issue resolution will be through the IT if needed. On an as-needed basis, the FPOM provides technical support and coordination for the TMT.

## Hydrosystem Substrategy 3.2: Non-routine maintenance of fish and wildlife facilities

### *2004 Work Plan*

Non-routine O&M activities are one-time activities or are very extensive and so are differentiated from routine O&M. The following non-routine operations and maintenance activities are planned at each of the FCRPS dams:

- Acquire fish facility spare parts–projects will continue to acquire the necessary spare parts to minimize facility outages due to equipment failures.
- Rehabilitate adult fish counting systems–rehabilitation needs will be reviewed at each project and plans will be developed for necessary work.
- Report real-time data on turbine and spillway settings on the Internet.
- Implement preventative maintenance programs to ensure the long-term reliability of fish passage facilities.
- Obstructions in turbine units–continue program to identify and remove obstructions that may injure fish.

Examples of project-specific actions are shown below. For a detailed listing, see Appendix A.

#### Bonneville Dam

- Rehabilitation of the Bradford Island and Cascades Island fishways.
- Refurbish aging STSs in the 2nd powerhouse.

#### The Dalles Dam

- Finish installation of new lifting cable extensions for the main entrances.

#### John Day Dam

- Award contracts for rebuilding powerhouse auxiliary water system (AWS) fish water pumps (one pump per year)
- Begin rehabilitation of STSs.

#### McNary Dam

- Contractor to install new Oregon fish ladder tilting weir controls.
- Prepare contract for replacing mesh on vertical barrier screens (VBSs).

#### Ice Harbor Dam

- Award contract to repair powerhouse adult collection channel dewatering valves, overhaul two south shore fish pump butterfly valves and install south shore fish pump discharge bulkhead guides.
- Finalize preparation of four-year contract to rehabilitate south shore adult fish pumps.

#### Lower Monumental Dam

- Complete three-year contract for adult fish pump rehabilitation (one pump per year).
- Design adult fish counting station upgrades.

#### Little Goose Dam

- Award contract to repair broken welds in juvenile fish facility dewatering structure and to paint wastewater drain side of structure.

Lower Granite Dam

- Finish preparing contract and then contract to paint the interior holds of two, 8000-series fish barges.

### *2005–2008 Work Plan*

Major, non-routine O&M projects anticipated in 2005–2008 are listed in Appendix A.

### *Regional Coordination*

Fish facility O&M activities are coordinated with the region through the FPOM and issue resolution is through the IT, if needed.

## Hydrosystem Substrategy 3.3: Juvenile fish transport actions to improve fish survival

This substrategy includes actions to collect and transport juvenile fish at Lower Granite, Little Goose, Lower Monumental and McNary dams. Transport is carried out in accordance with the NOAA Fisheries BiOp and the associated NOAA Fisheries Section 10 permit. The work plan for this substrategy is described in Appendix B to the FPP.

Priority for juvenile fish transportation varies, depending on total volume forecast, runoff and river flow levels, ESU and season. During the spring, under normal and greater flow conditions, all fish collected at Snake River projects are transported. Non-collected fish migrate in-river with passage provided through spill, juvenile bypass systems and efficient turbine operations. NOAA Fisheries has identified this so-called "spread-the-risk" strategy to provide a balance between transported and in-river migrants. At McNary, all spring migrants are bypassed except during extreme low flow conditions when transportation may be employed as a risk management strategy. During the summer, collection and transportation is maximized (no volitional bypass spill) under all runoff/flow conditions at the three Snake River projects and transportation begins at McNary each year when "spring-like" conditions (favorable flow and water temperature) no longer prevail.

### *2004 Work Plan*

Actions for 2004 include:

- Updating the annual work plan in association with Fish Passage Plan (FPP) development
- Collecting and transporting fish in accordance with the work plan
  - Operating juvenile collection facilities
  - Operating fish trailers and barges
  - In-season maintenance of transportation equipment
  - Rental of trucks and towboats
  - Contracting for state biologist participation
- Continuing extended barging season to increase the number of fish barged, thereby reducing the number of fish that are trucked
- Continuing to evaluate transport benefits for Snake River spring/summer Chinook, steelhead and fall Chinook and the performance of associated facilities and make annual recommendations for improvements.
  - Estimating transport/in-river ratios for returning adults.
  - Estimating delayed transportation mortality ("D").
  - Estimating differential transportation benefit based on migration timing, including estuary arrival.

### *2005–2008 Work Plan*

This is an annual program carried out in accordance with provisions described above. Activities will be adaptively managed with consideration of in-season fish migration conditions and application of research results and the transportation strategy that best contributes toward achievement of the total system survival performance standard.

### *Regional Coordination*

The juvenile fish transportation program, including annual updates, is coordinated through the FPOM, one- and five-year implementation plans and NOAA Fisheries permitting process. In-season operational changes may also be recommended by the TMT and dispute resolution, if needed, is handled through the IT.

## Hydrosystem Substrategy 3.4: Operations RM&E

Monitoring and evaluation of FCRPS fish facilities is conducted to determine if facilities are operating as intended to improve their performance. Examples of O&M–related RM&E include evaluation of juvenile fish transportation and adult passage at dams.

### *2004 Work Plan*

RM&E activities planned in 2004 are listed below. For more details, see Appendix A.

- **Juvenile fish transportation evaluation.** Evaluate survival and adult return rates of transported juvenile salmon compared to in-river migrating fish (spring and summer); post-release losses and barging strategies that minimize post-release mortality; and, benefits of trucking juvenile salmon.
- **Delayed mortality study.** Continue the study to determine comparative post-system delayed mortality, isolate areas of loss, evaluate behavioral changes and evaluate logistical and mechanical barging process.

### *2005–2008 Work Plan*

The RM&E efforts described above are expected to continue during 2005–2008. Depending on results, additional/modified studies may be initiated.

### *Regional Coordination*

Corps-funded RM&E is developed and coordinated through AFEP. Priorities and technical peer review occurs in a technical work group (Studies Review Work Group–SRWG) and coordination for funding priority occurs within the SCT. Activities will also be coordinated with the Action Agencies' RM&E program (see Section 5.6), which will interface with other regional RM&E processes (*e.g.,* TRT and Council's subbasin planning process).


## 5.2 Habitat Priorities

The habitat section of this plan provides a basic overview of the ongoing strategies, substrategies and examples of habitat projects that the Action Agencies plan to fund or undertake in FY04 consistent with requirements set forth in the 2000 BiOp. The plan also provides a summary of the regional coordination activities underway, and a general description of future habitat outcomes that will be further tailored as subbasin plans develop and are implemented.

This habitat plan continues with the same overall strategies and substrategies from the *2003/2003–2007 Implementation Plan* and continues to be consistent with and meet the objectives of the BiOp. As reported in last year's implementation plan, the Action Agencies have formulated a habitat protection and restoration program to improve survival of anadromous species found to be jeopardized by the FCRPS. Subbasin plans are scheduled to be submitted for approval in May 2004 and those plans are expected to be approved and under implementation in 2005. The Action Agencies will utilize the final subbasin plans to inform future project priorities. This plan, while fulfilling BiOp habitat objectives, describes an interim approach until subbasin plans are adopted, implementation plans are developed for each subbasin, and provincial review cycles begin again.

In the short term, the Action Agencies will implement actions proven to provide immediate benefits, *e.g.,* removing in-stream barriers, screening diversions and increasing and protecting stream flows. Concurrently, the Action Agencies are implementing projects and programs that will generate benefits over a longer time period, *e.g.,* riparian protection and restoration. Taken together, the short and long-term benefits efforts will fulfill the BiOp habitat objectives of:

- Protecting existing high quality habitat
- Restoring degraded habitats
- Preventing further habitat degradation

Our approach to meeting these BiOp objectives is focused in the geographic range of jeopardized anadromous fish, with individual strategies tailored for tributary habitat, mainstem habitat and estuary habitat. These objectives are being achieved through the implementation of several hundred diverse projects spread across the Columbia River Basin.

In the following sections, the habitat strategies and substrategies provide a comprehensive approach to achieving the objectives of habitat protection, restoration and enhancement consistent with the All-H Strategy. They link specific BiOp actions with broader mandates of the Action Agencies and the non-FCRPS Agencies. The substrategies identify projects that implement the habitat BiOp actions and address gaps in BiOp coverage.

This plan provides a profile of our overall approach to implementing the strategies and substrategies, how they address specific RPA actions, and a general description of the types of projects that will be initiated or are already underway. The accompanying tables (see Appendix A) provide a cross-walk to more project-specific information. In the longer term, as more information is forthcoming from the several concurrent planning efforts, the selection of projects for implementation in the habitat program is likely to be refined. Those efforts include the TRT "limiting factors" assessments, subbasin plans, the monitoring program for biological and physical performance relative to performance standards and research results on the effectiveness of actions.

**2004 Habitat Plan.** By working toward meeting habitat objectives (to improve water quantity, water quality, fish passage and diversions, watershed health and complete subbasin planning) in this plan, the Action Agencies will help provide biological benefits for jeopardized anadromous fish in tributary, mainstem and estuary areas. As subbasin planning and regional coordination continues, habitat actions will become even more focused and structured to alleviate the limiting factors to fish survival in the basin. The Action Agencies' habitat approach in this plan will help ensure progress continues on track in 2004 and beyond and is consistent with meeting the existing BiOp habitat objectives.

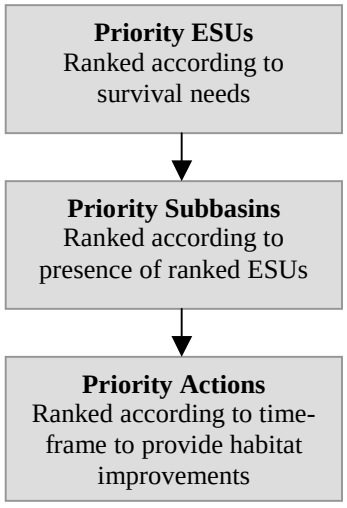
### *Regional Coordination*

Coordination to meet habitat objectives is taking place in many active forums in the region. These include watershed-based entities, state and tribal forums. A major aspect of coordination is the Council's subbasin planning process that is providing an important opportunity for coordination at

three levels: regional, state wide and subbasin. The Action Agencies are primarily participating at the regional level and, where appropriate, the state level. However, the Action Agencies believe there remains a need for a forum to coordinate the many ongoing federal habitat efforts at the region-wide scale and will work through the Federal Habitat Team to develop the forum concept with federal agencies. This forum may provide the opportunity to refine common metrics for reporting habitat actions, link habitat databases and share technical knowledge to accomplish similar habitat objectives across the basin.

## Habitat Strategy 1: Protect and Enhance Tributary Habitat

The *2003 Check-In Report* includes a discussion of the overall priorities established by the Action Agencies to protect and enhance tributary habitat in lieu of site-specific subbasin habitat plans that await the completion of the Council-sponsored subbasin plans. That interim strategy is based on a (1) prioritization of ESUs considering the rate of needed survival change as identified in the BiOp, (2) prioritization of the subbasins utilized by the priority ESUs and (3) prioritization of types of actions, *i.e.,* those actions with near-term effects are considered of greater importance for immediate implementation than those actions with longer term effects.




This interim strategy conforms to the strategy developed in FY 2003 that was informed by the ISAB. The ISAB recommended that the region concentrate on three elements for success: increasing flows, removing blockages and making the shift to an ecosystem management approach. In keeping with these recommendations, increasing flows and removing migration blockages are near-term actions that are considered to be priority actions in the tributaries. The Action Agencies are also protecting riparian habitat and terrestrial areas adjacent to productive fish habitat as an approach to provide significant long-term benefits.

### *Five-Year (2004–2008) Outcomes*

In this section we generally describe the tributary habitat efforts that are planned in the next five years to meet BiOp objectives. A more detailed discussion of projects planned for 2004 and 2005–2008 follows under each substrategy.

By 2008, the Action Agencies expect to achieve the following outcomes consistent with strategies identified in approved subbasin plans:

- Coordinate offsite habitat enhancement measures to improve water quality by funding protection of productive non-federal habitat through acquisitions and easements.
- Improve water quantity and increase tributary flows by processing water solicitations and complete transactions; coordinating water and habitat objectives; and developing stream flow protocol methodologies/studies and water acquisition processes.
- Implement passage and diversion improvements with emphasis on the priority subbasins identified in RPA 149
- Protect productive non-federal habitat through acquisitions and easements. Continuation of land acquisitions and easements may be dependent on resolution of capitalization and crediting issues.
- Secure long-term protection of riparian buffers.
- Implement site-specific implementation actions to benefit ESUs based on the Council's completed subbasin plans.

### Habitat Substrategy 1.1: Water Quantity

#### *2004 Work Plan*

*Reclamation Projects–(RPA Action 149)*

Lease/acquire stream flows

- Continue to work through the State of Idaho's water banks to lease stream flows in the lower reaches of the Lemhi River during critical low water periods at the end of the summer.
- Other potential water acquisition initiatives will continue to be explored with the State of Washington through its adjudication process and with the State of Oregon agencies and entities.
- Wherever possible, coordinate water acquisitions with the Columbia Basin Water Transactions Program that was established by BPA in 2003 to comply with Action 151.

Initiate and continue in-stream flow evaluation studies

- Quantify fish flow needs for access, spawning and rearing in priority subbasins.
- Instream flow studies initiated in FY03 by Reclamation or funded by Reclamation in eight of the priority subbasins selected under RPA 149 will continue.

- If needed, studies in additional priority subbasins may be initiated in FY04.
- The results of the flow studies will be shared with the appropriate state water regulatory agencies for consideration under state water law.

Replace headgates

- Provide technical assistance for headgate replacement projects identified in the Upper Salmon River, Middle Fork John Day and other Action 149 priority subbasins as opportunities are identified. Headgate replacement projects are designed to control the amount of water diverted from the stream and provide better flow measurements, assisting landowners' to manage their water rights.

Increase instream flows

- Replace surface water diversions.
- Provide technical assistance for projects in the Methow River and Upper Salmon River subbasins to replace surface water diversions with wells where those replacements can help preserve instream tributary migration flows.

Continue implementing streamflow programs

- Implement streamflow programs in the Lemhi, Upper Salmon, Little Salmon, Methow, Wenatchee, Entiat, Upper John Day, Middle Fork John Day and North Fork John Day subbasins in 2004 to meet the tributary habitat restoration objectives through passage, screening and flow improvements.
- Establish new subbasin liaison contacts, as needed for any subbasin programs that are initiated that year.
- Ongoing negotiations with NOAA Fisheries will determine the identity and number of additional priority subbasins. (Those negotiations need to be completed and additional priority subbasins from RPA 149 identified by January 2004 or the establishment of additional priority subbasin programs during FY04 will be extremely difficult.)

*BPA Projects – (RPA Actions 151)*

Acquire/improve flows at tributary diversions

- The Columbia Basin Water Transactions Program has a goal to secure over 75 cfs of flow in 2004 in areas where insufficient tributary flows can be a limiting factor to the survival of anadromous fish. The local entities have identified over 20 potential transactions projected to increase tributary flows by up to 92 cfs through innovative acquisitions in several areas, including the John Day, Walla Walla, Willamette, Umatilla, Grande Ronde, Deschutes, Yakima and Salmon subbasins.

Explore innovative types of water transactions

- A regional water entity has been established and is operating to facilitate tributary water transactions basinwide. The National Fish and Wildlife Foundation (NFWF) is serving as the regional entity and qualified ten local entities (QLEs) to launch the Columbia Basin Water Transactions Program (CBWTP). NFWF is managing this program to implement Action 151 through a cooperative funding agreement administered by BPA. BPA funding is supporting program management, implementation of innovative transactional strategies, tributary flow acquisitions and some monitoring of the transactions.
- This regional entity is working through qualified local entities to identify and develop opportunities for providing cost-effective in-stream flows to benefit fish. NFWF will submit a report evaluating its efforts annually and at the end of five years. In 2004, NFWF anticipates the CBWTP will implement an increased number of transactions that provide greater ecological benefit and test a wider range of transaction tools and strategies. NFWF projects recommending BPA funding for transactions that put between 100–125 cfs instream in total and 75–100 cfs instream in jeopardized ESUs. A significant number of recommended transactions are expected to put water instream permanently or a long-term basis, in contrast to FY 2003 transactions that were exclusively short term. NFWF also expects participating entities to propose several innovative transaction tools including purchase of conserved water, a combination land and water right purchase and a refined reverse auction. NFWF also expects the participating entities to implement new strategic approaches to water transactions. Additional information about the water entity and the Columbia Basin Water Transactions Program (CBWTP) is available at the following site: http://www.nfwf.org/watertransactionsprogram/index.htm
- The local entities funded by BPA for 2004 to use innovative transactional strategies to secure tributary flows for anadromous fish include the Oregon Water Trust, Deschutes Resources Conservancy, Oregon Water Resources Department, Washington Water Trust, Walla Walla Watershed Alliance, Bonneville Environmental Foundation and the Idaho Department of Water Resources Department.

Build a regional structure for flow improvements

The regional water entity described above will also pursue:

- Ongoing coordination and annual reporting of water transactions.
- Ongoing development of a competitive process to supply water to increase flows.

Ongoing development of water solicitations and selection of the most promising transaction proposals.

- Ongoing development of a regional clearinghouse and public information site for water transactions.

Develop criteria and priorities

- Criteria and priorities for the regional water entity to use in the selection of water transactions was developed in 2001 to 2002 in BPA water group meetings with NOAA Fisheries, the Council and others. The Action Agencies will also work with NOAA Fisheries, USFWS, state water agencies and others to develop a methodology for evaluating the biological effectiveness of documented increases in quantity of instream tributary water.

### *2005–2008 Work Plan*

In addition to the continuing activities described above, the Action Agencies plan to:

- Develop stream flow protocol methodologies/studies and water acquisition processes or incorporate the protocols provided by NOAA Fisheries.
- Use the results of instream flow studies in the priority subbasins to enhance water acquisition strategies. NOAA Fisheries has provided BPA and Reclamation with a draft methodology capable of ascertaining instream flows that meet ESA requirements.
- Enable the regional water entity, the National Fish and Wildlife Foundation, to qualify additional local entities, pursue cost-sharing agreements and further implement the Columbia Basin Water Transactions Program.
- In 2007, complete the report evaluating the efficacy of the regional water entity and the CBWTP required by the BiOp after five years of implementing the water entity project, including a decision on whether to continue the program. Annual reports, due in January of each year from the CBWTP, will also be developed for discussions of effective transactional strategies and lessons learned.

### *Regional Coordination*

Coordination will take place through Reclamation subbasin programs, the regional water entity (including quarterly forums for the Columbia Basin Water Transactions Program, with participation by BPA, NFWF, Council, NOAA Fisheries and key representatives of state water agencies, local water trusts and watershed groups involved in efforts to increase tributary flows across the basin through innovative strategies) and the Council.

## Habitat Substrategy 1.2: Water Quality (RPA Actions 150 and 152)

### *2004 Work Plan*

Coordinate offsite habitat enhancement measures to improve water quality

BPA is implementing several projects that will benefit water quality. Several of these actions will support 303(d) listing or delisting and fit within the context and timing of TMDL development or implementation. Examples of such projects are as follows:

- Wind River Watershed Restoration. The Underwood Conservation District supported WDOE development of 303(d) list information and a TMDL for the Wind River watershed. BPA funds several other habitat and research projects in the watershed.
- Lower Red River Meadow Restoration Project. This project, associated with the South Fork Clearwater River subbasin assessment and TMDL, is being used in 303(d) list updates and potentially for TMDL implementation to reduce temperatures and sediment load. It will include a temperature monitoring program that will be useful for BiOp and TMDL purposes.
- StreamNet (CIS/NED). Working with EPA staff, this project creates maps and data layers which combine 303(d) listing and fish presence. These maps are updated for subbasin planning purposes. Project generated fish presence and distribution maps are being used for NOAA Fisheries Critical Habitat designations and water quality agency water-body use designations.

Improve coordination and documentation of TMDL efforts

BPA will share technical expertise, policy information and training with stakeholders to integrate multi-agency activities into the TMDLs during the subbasin planning process. Specifically, BPA will meet with state water quality agencies and EPA to:

- Obtain up-to-date schedules and agendas for TMDL development activities and 303(d) meetings,
- Furnish the water quality agencies with lists of BPA-funded projects sorted by province, subbasin and BPA project manager from the Implementation Plan database.

- Keep water quality agencies informed of subbasin planning schedules and contacts and encourage their participation through Level II subbasin planning structures;
- Agree on activities needed to ensure progress on meeting the Federal consistency provisions of Section 319 of the Clean Water Act;
- Scope activities to provide state agencies with water quality, biological and habitat data from BPA-funded projects which can be of use in 303(d) listing, 305(b) assessment, TMDLs and ambient monitoring programs; these arrangements may be formalized by an memorandum of agreement or understanding between the agencies. Discussions are occurring with BPA, WDOE and IDEQ.
- Seek integration of Action Agency, fish and wildlife agency and water quality agency monitoring approaches, particularly in the context of BiOp RM&E needs and subbasin planning monitoring and assessment.

BPA is also supporting water quality improvements in partnership with the states and others. For example, we are funding the Idaho Department of Water Resources to explore and implement ways to increase tributary flows. In the Walla Walla subbasin of Oregon and Washington, BPA will provide support to the Walla Walla Watershed Alliance and Oregon Water Trust to improve and monitor streamflows across the two state borders.

### *2005–2008 Work Plan*

The Action Agencies will continue to coordinate offsite habitat enhancement measures to improve water quality and will work closely with state and tribal TMDL programs to identify mutual priorities and share technical expertise and training.

**2005**– Meet with Tribal water quality agencies with Water Quality Standards or TMDL responsibilities; seek the same level of exchange of project information and water quality or other desired data.

**2005 to 2008**–Continued coordination with states, tribes and watershed organizations in BPA's project areas; work to link TMDL, Council Fish and Wildlife project and subbasin planning activities, emphasizing ESA priority streams; progress in agreement on common water quality data standards within the context of the evolving Columbia Basin Cooperative Information System (CBCIS).

### *Regional Coordination*

Coordination will occur through state and tribal TMDL processes, the Council's Fish and Wildlife Program, subbasin planning and the Federal Habitat Team.

## Habitat Substrategy 1.3: Passage and Diversion Improvements (RPA Action 149)

### *2004 Work Plan*

## Reclamation Projects

Screening diversions and removing obstructions

- In 2001, Reclamation initiated programs to improve tributary habitat in priority subbasins by screening diversions and removing obstructions to passage in the Lemhi, Methow and Upper and Middle Fork John Day subbasins. In 2002, Reclamation initiated similar programs in the Wenatchee, Upper Salmon and Entiat subbasins; and in 2003 programs were initiated in the North Fork John Day and Little Salmon subbasins. In total, these nine priority subbasin programs meet the expectations of RPA Action 149. These programs will continue in 2004 and additional priority subbasin programs will be initiated if unresolved issues associated with the identity of the specific priority subbasins can be resolved in a timely fashion. Unfortunately, a 2004 work plan for new subbasins cannot be developed until the new priority subbasins are identified.
- Initiate or be actively working on about 20 screen replacements and 40 barrier replacement projects in the active priority subbasins. Of these, all of the screen projects and more than half of the barrier projects are scheduled for completion in 2004.
- Other as-yet-unidentified projects will also be initiated. Any new priority subbasin programs that may be initiated during FY04 may also yield new, as yet unspecified, projects.

Construction funding authority

- On June 20, 2003, a bill to provide authority for Reclamation to fund the construction of screen or barrier projects in the priority subbasins was introduced in the Senate of the United States Congress (S. 1307). A Senate subcommittee hearing on the bill was held on October 15, 2003. Upon enactment, Reclamation will begin to directly fund the construction of those projects. In the interim, landowners, states and BPA will continue to fund project construction costs and Reclamation will continue to fund and/or perform the engineering and environmental and permitting analyses.

Project prioritization

- The Council's subbasin plans promulgated under the Provincial Review process and local recovery plans established from the TRT process will, when completed, provide the context for prioritizing projects for Reclamation's program. Further refinement of project selection is expected when results of the pilot studies on survival improvements that can be expected from certain habitat actions (as described under the RM&E implementation plan) are available. In the interim, Reclamation will select projects in the subbasins based upon the general biological prioritization criteria adopted by the Action Agencies as described in the *2003 Check-In Report.* In addition, projects will be selected based upon the following considerations:

  • Willingness of landowners to participate in the program;

  • Migration barriers at diversion structures which block access to otherwise available habitat;

  • Unscreened diversions on streams to which fish currently have access;

  • Diversion screens which do not meet current criteria and are located on streams to which fish currently have access;

  • Those stream flow barriers or screens which appear to affect the largest number of fish—those lower in the stream system, versus those higher in the system; and

  • Availability of appropriated funds.

## BPA Projects

Passage, screening and flow projects

- Based on subbasin summaries, ISRP Review and BiOp priorities, BPA will support over 40 projects during 2004 that help address passage, screening and flow problems in over 15 subbasins, including John Day, Salmon, Wenatchee, Entiat, Methow, Cascade, Clearwater, Deschutes, Grande Ronde, Hood, Okanogan, Umatilla, Tucannon, Walla Walla and Yakima. BPA will utilize the programmatic Section 7 consultation under ESA completed with NOAA Fisheries in 2003 to help streamline the implementation of these projects.
- For RPA 149 priority areas in Oregon, BPA will support a John Day Watershed Restoration Program, a pump screening project lead by ODFW; removal of gravel push-up dams in the lower North Fork; and maintenance of passage along 14 riparian miles and 800 acres and tributary habitat obtained by the Forest Ranch acquisition.
- For priority areas in Washington, BPA will support screening and diversion improvements through the Methow Valley Irrigation District Rehabilitation Project and the Hancock Springs Passage and Habitat Restoration Improvement Project.
- In Idaho, BPA will support screening in priority areas in the Salmon and across the State through the Idaho Fish Screen Improvement Project. Additional Action 149 activities will take place in Idaho under the Holistic Restoration of Critical Habitat on Non-Federal Lands now implemented in five different watersheds.
- BPA will also continue efforts in other areas in addition to the priority subbasins under Action 149. These additional efforts occur throughout the basin with most of the projects focused in the Yakima, Grande Ronde and Walla Walla subbasins.
- In the Yakima, BPA will support systematic removal of passage barriers along tributary stretches, fabrication and installation of screens and related flow improvements.
- In the Grande Ronde, BPA will support flow improvement in Catherine Creek, stream gaging in Wallowa County, fish passage in Beaver Creek and culvert replacements within the basin.
- In the Clearwater, BPA will support work to improve tributary habitat in multiple watershed areas including Lolo Creek, Bear to Fishing Creek, Meadow Creek, Little Canyon Creek, Big Canyon Creek, Lapwai Creek, Newsome Creek and Mill Creek.
- BPA will also maintain passage and install fish screens through several projects such as the projects to improve Walla Walla River Fish Passage Operations and install juvenile screens at the Walla Walla River.

## Corps Projects

Investigations and restoration projects

- The Corps will continue a general investigation study for the Walla Walla River. A three-year feasibility study was initiated in 2003 to gather baseline information. This, in turn, will help develop potential alternatives for multiple habitat improvement projects to restore in-stream flows, improve riparian habitat and improve fish passage.
- The Corps will also continue to use existing authorities for ongoing cost-shared ecosystem restoration projects and work with interested parties to identify potential new projects. Work will continue in 2004 through 2005 in a 12-mile stretch of the Salmon River in Challis, Idaho, to restore natural channel and geomorphic function. This project is a partnership with BPA, University of Idaho

and a consortium of state and local agencies involved with the Upper Salmon Basin Watershed Project.

### *2005–2008 Work Plan*

The Action Agencies will continue to implement passage and diversion improvements working with non-Federal property owners in the high priority subbasins during this time period. They will initiate barrier removal and screening programs, and initiate administrative processes, NEPA and Section 7 consultation, if indicated, to support the initiation of such programs.

### *Regional Coordination*

Reclamation subbasin liaison offices have been established to accommodate coordination efforts in nine priority subbasins. The subbasin liaison officers will continue to provide coordination services with local, state and federal entities. Regional coordination will also occur via the subbasin planning processes.

## Habitat Substrategy 1.4: Subbasin Planning and Assessment (RPA Action 154)

### *2004 Work Plan*

Coordinate with states, tribes and local planning initiatives

- BPA is supporting the development and implementation of the Wy-Kan-Ush-Mi Wa-Kish-Wit Watershed Plan for four lower Columbia River tribes.

Support development of subbasin assessments and plans

- The All-H Strategy recommends targeting habitat actions by means of subbasin assessment and planning through the Council and through watershed assessment and planning at the local level with federal assistance. The Action Agencies will continue to provide a share of technical support for subbasin assessments and plans and are working with the Council to help ensure that subbasin plans are completed in a timely manner.
- Under the master contract between BPA and the Council for subbasin planning, BPA funds support for subbasin planning by local planners through May of 2004, when the plans are scheduled for review by the ISRP. The Action Agencies anticipate that the final plans will be ready to guide implementation by 2005.
- BPA will also implement projects that support individual subbasin assessment and planning efforts. Examples of such projects include ongoing support for the Klickitat River subbasin assessment and administrative and technical support to watershed groups in the Upper Salmon Basin, Sherman County in the John Day and Grande Ronde.

### *2005–2008 Work Plan*

The Action Agencies plan to use subbasin plans to identify and prioritize habitat projects that meet BiOp objectives and will continue to provide technical support to the Council that will further the completion of remaining subbasin plans.

### *Regional Coordination*

Coordination will occur through the Council's subbasin planning processes.

## Habitat Substrategy 1.5: Watershed Health (RPA Action 153)

### *2004 Work Plan*

Protect and enhance riparian buffers

- During 2004, BPA will continue to improve watershed health through projects creating and improving riparian buffers. Action 153 has a goal to negotiate and fund long-term protection for 100 miles of riparian buffer each year. BPA continues to strengthen support for riparian protection through programs under the Farm Bill (including the Conservation Reserve Enhancement Program (CREP) and other riparian incentive programs) using a two-tier approach. Tier 1 is a continued effort to develop and implement a method for establishing long-term protection for lands enrolled in these programs. Tier 2 consists of continued support of CREP implementation and other similar programs as needed to develop, refine and implement and support components of a long-term protection mechanism.
- With cost-share provisions that can provide up to 15 years of landowner payments from USDA for conservation easements covering up to 100,000 acres per state, CREP is a major tool for providing riparian protection in the basin. Several agencies in Oregon are analyzing options to add a long-term easement to CREP and propose projects for funding. In the interim, BPA will also fund riparian protection not associated with CREP but with the same overall goal to obtain miles of long-term riparian protection. These projects use similar protection methods such as leasing or purchasing riparian land and conducting enhancement activities such as fencing and planting in these riparian areas. Because CREP is not set up in the Northwest to provide significantly long-term (greater than 15 years) protection, BPA will continue projects that provide riparian protection for 15 years and for projects outside of the CREP. BPA will also continue coordination with Oregon Watershed Enhancement Board and the

Washington Conservation Commission on the research and analysis underway by Oregon State University and others for including a 30-year or permanent protection approach as part of CREP. As CREP is strengthened and more projects are proposed, a greater number of CREP related projects will be part of the Action Agencies' tributary habitat strategy to improve watershed health in riparian areas.

- Under the Council's Fish and Wildlife Program, BPA will directly funding over 20 projects from local sponsors that help protect over 100 miles of riparian habitat each year. BPA will fund projects to enhance riparian areas on lands with several years to permanent protection through conservation leases, easements, or previous fee simple permanent acquisitions. Resolution of capitalization funding issues may affect the extent of BPA's ability to fund land protection. Several riparian projects are set up to specifically provide increased enrollment of land and riparian protection through CREP. This effort includes projects with conservation districts in Wasco, Wheeler, Gilliam, Morrow and Asotin counties, Oregon. Protected streams will be in the Deschutes, Fifteenmile, John Day, Umatilla and Asotin subbasins. Additional projects involving CREP are located in the Grande Ronde, Walla Walla, Umatilla, Tucannon, Fifteenmile and Trout Creek subbasins.

### BPA is supporting additional riparian protection efforts in multiple provinces

- There are several projects underway in the Clearwater subbasin of the Mountain Snake province. These projects include riparian planting, fencing and conservation management planning. Idaho does not have currently have CREP available, but enrollment in the CRP program is possible and included in many Idaho projects.
- In the Columbia Plateau province, there is one riparian habitat project in the Deschutes subbasin and two additional projects in the John Day subbasin. These include riparian planting, fencing, stream restoration and possible CREP. In the Yakima, side channels and riparian lands in the Status and Upper Toppenish watersheds will be protected and enhanced. Yakima lands will also be prioritized for possible acquisition or enrollment in USDA environmental quality incentive programs.
- In the Columbia Gorge province, there are additional projects in the Fifteenmile and Hood subbasins. These projects include riparian fencing and other habitat improvement projects.
- In the Columbia Cascade province, there is a project in the Okanogan subbasin and the Methow subbasin. The projects include habitat restoration and enhancement in Salmon Creek and the Hancock Springs area, respectively.
- Corps projects contributing to watershed health include a Salmon Creek, Vancouver, WA, project to re-establish riparian forest and native wetland plant communities in Salmon Creek flood plain and restore side channels to flood plain. Potential modifications to Salmon Creek channel and construction of a fish ladder could improve fish access to upper reaches of Salmon Creek. The project plan is to initiate construction in 2005.

### Protect currently productive non-federal habitat at risk of being degraded

- The Action Agencies and NOAA Fisheries have developed a list of criteria and priorities for identification and protection of productive non-federal anadromous fish habitat, especially if at risk of being degraded. BPA will use these criteria to guide habitat acquisitions, as capitalization and crediting issues relating to land acquisitions are resolved.
- To improve watershed health, BPA has placed a high priority on protecting, by acquisitions and easements, productive non-federal anadromous fish habitat where such habitats are at risk of being degraded in accord with the RPA 150 criteria. Although most new acquisitions of land are on hold pending resolution of capitalization funding issues, efforts to protect previously secured lands in productive areas and associated uplands are still continuing in 2004. This includes efforts to maintain and improve riparian buffer areas obtained through the acquisitions of Pine Creek Ranch, Oxbow Ranch, Wagner Ranch and Forrest Ranch, all located in the John Day subbasin. Enhancements on lands secured in productive areas such as in Joseph Creek, the Helm Tract in the Grande Ronde subbasin, and the Iskuulpa Watershed in the Umatilla subbasin will also occur in 2004.

### *2005–2008 Work Plan*

The Action Agencies plan to continue to protect 100 miles of riparian buffers per year. The Action Agencies will implement the riparian buffer protection program through support for projects using CREP and other riparian incentive initiatives. Other continuing activities include identification and protection of non-federal habitats that are at risk of being degraded. The Action Agencies will fund protection of those habitats through easements and additional acquisitions, if capitalization issues for land acquisitions can be resolved. The Action Agencies will also work with state agencies to determine the best options for maximizing and extending the terms of protection for the riparian buffers acquired.

### *Regional Coordination*

Coordination will take place through the Council's subbasin planning processes and State/CREP riparian protection steering committee meetings.

## Habitat Strategy 2: Protect and Enhance Mainstem Habitat

### *Five-Year (2004–2008) Outcomes*

The All-H Strategy and the Independent Scientific Group's *Return to the River* report suggest that important gains in salmon productivity could come from increases in mainstem spawning and rearing habitat. In particular, actions are needed to improve the spawning habitat for chum salmon in the lower Columbia River. The Council's 2000 Fish and Wildlife Program states that "protection and restoration of mainstem habitat conditions must be a critical piece of this habitat based program."

The NOAA Fisheries BiOp and the All-H Strategy call for an experimental program to identify ways to increase spawning and rearing habitat in the mainstem of the Columbia and Snake Rivers. BPA and other agencies are to survey mainstem habitats, develop plans for improvement and initiate improvements in three reaches. Consequently, the Action Agencies will continue to pursue projects in the mainstem that implement substrategies to improve Watershed Health.

### Habitat Substrategy 2.1: Watershed Health (RPA Actions 155, 156 and 157)

### *2004 Work Plan*

Seven BPA projects implementing this substrategy are underway in the Columbia Lower, Mainstem and Cowlitz subbasins. These projects will improve tributary and mainstem chum habitat by protecting tributary and mainstem habitats through purchase, easement and restoration projects. Specific tasks in 2004 include:

#### Identify research needs, develop improvement plans and initiate improvements in three mainstem reaches

- The Action Agencies plan to improve mainstem habitat by increasing habitat diversity, complexity and productivity. NOAA Fisheries RPA Action 155 calls for a program to develop habitat improvement plans for mainstem reaches and initiate improvements.
- The Corps is exploring its existing authority and potential for expanded authority under the Lower Snake River Fish and Wildlife Compensation Plan (LSRCP) for further actions to enhance habitat in Snake River mainstem areas. Some potential actions include develop sloughs and backwater areas, add habitat complexity, develop riparian zones, re-establish/enhance wetlands and wetland channel sloughs. Effort will be given to preserving and perpetuating the natural salmon spawning and rearing habitat.
- In the Columbia Lower subbasin, BPA is working with the Oregon Department of Fish and Wildlife (ODFW) to determine whether Chinook and chum salmon spawning populations exist below each of the four mainstem Columbia River dams. Specifically, under this substrategy, we will continue collection of baseline data to address uncertainties, identify cause-and-effect relationships, identify potential restoration sites; and report results annually.
- BPA is also coordinating with the Pacific Northwest National Laboratory (PNNL) to consider additional research for mainstem improvements at the Ice Harbor Dam tailrace downstream to the Columbia River confluence and the Lower Granite Dam tailrace. Previous studies by PNNL indicated that these two areas have high potential for restoring salmon spawning habitat, especially habitat for Snake River fall Chinook.

#### Improve spawning conditions for chum salmon in the Ives Island area

- BPA is working with several agencies to determine whether Chinook and chum spawning populations exist below four mainstem Columbia River dams. In 2001, baseline information was collected on habitat type, use and riverbed temperatures in the Ives Island area.
- The Action Agencies, led by the Corps, have also begun studying the feasibility (both biological benefits and ecological risks) of habitat modification to improve spawning conditions for chum salmon in the Ives Island area. A project identified for Lena's Lake under this study is currently in the design and investigations phase. If a feasible project is found for further implementation, construction is scheduled for summer 2004. Once the feasibility study is completed in the fall of 2003, it will be presented to NOAA Fisheries and shared with other interested agencies and tribes.
- The Action Agencies will also continue to transplant adults from Ives Island.

#### Improve spawning conditions for chum salmon at Duncan Creek

- BPA will continue to fund WDFW effort to rehabilitate and stock Duncan Creek with chum and an evaluation of spawning channel performance for chum habitat as the project moves into its third phase of implementation.

- BPA will also continue to fund a Duncan Creek project jointly submitted by the Pacific States Marine Fisheries Commission and WDFW. The project will rebuild the spawning channel and reintroduce chum salmon with a goal of developing a self-sustaining population. What is discovered by the introduction effort at Duncan Creek may have profound beneficial effects on chum recovery throughout the Lower Columbia. This project promises to benefit chum salmon, coho salmon and sea-run cutthroat in the lower Columbia River through an innovative approach to natural restoration of salmonids.

Evaluate factors limiting chum salmon production

- The Action Agencies are also supporting a USFWS project to evaluate factors limiting chum salmon production, spawning group relationships, population dynamics, biological and ecological characteristics of chum in tributaries and mainstem areas below Bonneville Dam and chum movements above Bonneville Dam. The project generates information useful for protecting these remnant chum salmon in the Lower Columbia.

Improve and restore tributary and mainstem habitat for Columbia River chum salmon

- The Action Agencies will develop and implement an effective habitat improvement plan to protect, restore and/or create potential spawning habitat in the Columbia River mainstem and adjacent tributaries through purchase, easement, or other means. This effort includes a BPA project supporting channel reopening to benefit chum and other salmon in the Sandy River delta.
- The Corps is working with WDFW, LCFRB and PSMFC to identify opportunities in Lacamas Creek and Gray's River for habitat improvement for the benefit of chum salmon.

Predator control

- The Action Agencies will continue to promote the increased catch of northern pikeminnow through reward incentives.

### *2005–2008 Work Plan*

Increase habitat diversity, complexity and productivity in the mainstem

- The Action Agencies will continue to work with appropriate regional entities and initiate improvements in three mainstem reaches and annually report results in the progress reports. In 2006, the Action Agencies will assess the results and decide whether to make changes in the program.

Determine benefits of increasing access to and, extent of, chum spawning habitat and factors limiting chum salmon production

- In 2005, the Action Agencies will continue funding WDFW, ODFW and USFWS RM&E efforts to assess effectiveness of chum habitat modifications. The agencies will continue to monitor chum populations.

Protect tributary and mainstem habitats

- The Action Agencies will continue to protect via purchase, easement, or other means existing or potential chum spawning habitat in this and adjacent reaches. They will also continue to monitor chum habitat improvements and transplant adults from Ives Island.

Predator control

- The Action Agencies will continue to promote the increased catch of northern pikeminnow through reward incentives.

### *Regional Coordination*

The Action Agencies will coordinate their implementation of mainstem habitat activities through interactions with the states, Lower Columbia Fish Recovery Board (LCFRB), Lower Columbia River Estuary Partnership (LCREP) and the Council's subbasin planning processes.

## Habitat Strategy 3: Protect and Enhance Estuary Habitat

To rebuild productivity for ESA-listed salmon populations, the Corps and BPA plan to continue a 10-year program to protect/enhance tidal wetlands and other key estuary habitats. Because much is unknown at this time about salmonid use of the estuary and Columbia River, the approach includes concurrent research, planning and restoration activities. This approach will allow important on-the-ground recovery efforts to assist in salmon recovery to proceed while research and planning efforts occur to better inform future actions.

Current Federal activity in the estuary includes research by NOAA Fisheries and others that is supported by BPA and the Corps and habitat restoration activities. The Action Agencies will continue to work with the states of Oregon and Washington along with LCRFB and LCREP to assess, prioritize and move forward with habitat acquisition and improvement projects.

### *Five-Year (2004–2008) Outcomes*

The Action Agencies will support the protection and restoration of the estuary by implementing and achieving the following outcomes and priorities:

### Planning

The Corps and LCREP, in partnership with BPA and the states of Oregon and Washington, are developing a long-range plan for protection and restoration of the estuary that is broader in scope than the needs for implementation under the NOAA Fisheries BiOp. This General Investigation (GI) study for ecosystem restoration in the Columbia River estuary (covering from the river mouth to river mile 145) is expected to continue to 2007, but results will inform actions for the estuary along the way. The Action Agencies plan to address the habitat needs of salmon and steelhead in the estuary in coordination with the GI feasibility study to avoid duplication of efforts.

BPA is concurrently funding a project by Battelle, with LCREP and the Columbia River Estuary Study Taskforce (CREST), to address the planning requirements of Action 159. This study was reviewed by the ISRP and is now complete. The project will provide an immediate plan for the activities in the estuary while the more comprehensive GI study proceeds. This effort should help in the development of performance standards and measures for the estuary. BPA is supporting an LCREP project with the Corps to assess and map habitat in the Lower Columbia River.

### On-the-ground restoration projects

The Corps will use existing and new authorities to protect and enhance 5,000 acres of estuary habitat during this five-year period. Congress provided a new authority (Section 536) to the Corps for habitat work in the estuary. This authority requires cost sharing that may be provided by the States, local governments, LCREP or BPA through the Council's Provincial Review and subbasin planning processes. Projects on federal land may be implemented without cost share. Under this authority, the Corps plans to implement ecosystem restoration projects to protect, monitor and restore fish and wildlife habitat in close coordination with LCREP. This program is expected to generate a mosaic of restoration projects that will address Action 160 of the NOAA Fisheries BiOp and augment the comprehensive master plan generated by the GI study.

The Corps will also continue to seek and pursue opportunities for habitat restoration or enhancement projects in the estuary under available authorities such as the Section 1135 and 206 restoration authorities.

### Research

Research will continue in the estuary, guided by the Research, Monitoring and Evaluation Estuary/Ocean RM&E Work Group, with input from NOAA Fisheries and by regional review processes, including the Corps AFEP and the Council's Provincial Review and subbasin planning processes. The Estuary/Ocean RM&E Work Group, established in summer 2002, developed a draft RM&E plan that has been submitted to the ISRP and ISAB for review. This work group will continue to develop and implement the RM&E plan. This group includes a representative each from NOAA Fisheries, the Corps, BPA and Pacific Northwest National Laboratory (PNNL). The LCREP and its science work group are kept informed by the Estuary RM&E subgroup's efforts. The final plan will include performance standards, a needs assessment and an action plan for implementation of estuary-related RM&E actions. This plan will be used to help direct Action Agency RM&E efforts in the estuary. Integration of estuary research in the overall RM&E plan is covered in more detail under the RM&E section of this document.

## Habitat Substrategy 3.1: Water quantity and Habitat Substrategy 3.2 Water quality

The Action Agencies have determined that the Watershed Health and Subbasin Planning and Assessment substrategies are a better fit for the Columbia River Estuary program activities. While Water Quantity and Water Quality will improve as actions are implemented, specific estuary work does not fit well in either of these substrategy categories. Actions that were included under these categories in draft Implementation Plans have been reorganized into the remaining substrategies. Estuary habitat substrategies 3.1 and 3.2 will be deleted in future implementation plans.

## Habitat Substrategy 3.3: Watershed health (RPA Actions 158–162)

### *2004 Work Plan*

### Planning

- The feasibility phase of the Corps' general investigations ecosystem restoration study for the Columbia River estuary, covering from the river mouth to river mile 145, will continue in 2004 with completion expected in 2007. Results will inform actions for the estuary along the way. The feasibility phase will be cost shared with regional partners, assisted by BPA funds. The Corps is planning for a project cooperation agreement with the states of Oregon and Washington to be signed in January 2004. The expected outcome of the study is a strategic master plan for the estuary identifying long-range, larger projects.
- The Corps and BPA provided a draft action plan to NOAA Fisheries for review for the estuary program in September 2003. This action plan articulates how the Corps and BPA intend to meet BiOp actions in the estuary (Action 158).
- BPA is funding a project by Battelle, with LCREP and the Columbia River Estuary Study Taskforce (CREST)

to provide a "landscape" scale restoration plan for the estuary (Action 159). This project will provide a near-term plan for the activities in the estuary while the longer term GI study discussed above proceeds. This plan, "An Ecosystem-Based Restoration Plan with Emphasis on Salmonid Habitats in the Columbia River Estuary," was reviewed by the ISRP. This plan was completed in September 2003.

- The Corps and BPA have entered into an agreement with LCREP to map the estuary and lower Columbia River. This will help define the baseline for further planning and monitoring. This project was completed in October 2003.

## Protect, enhance or restore estuary habitat

- The Corps and BPA have begun a 10-year program to protect/enhance 10,000 acres of tidal wetlands and other key estuary habitats in the Columbia River Estuary. The following habitat enhancement projects identified from findings from an Estuary Workshop held by the Corps, LCREP, American Rivers and Columbia River Estuary Study Task Force will be initiated in the estuary in 2004 under the Section 536 authority, or under Section 1135 or Section 206 authorities.

**Crims Island**

Through the Columbia Land Trust, BPA funded the acquisition of 451 acres of Crims Island in August 2003. The Corps is continuing with the planning and design of the project, which includes pre-project baseline fisheries monitoring. This project is scheduled for construction in summer 2004.

**Brownsmead**

This project is located three miles northeast of Knappa, Oregon, and is scheduled for construction in 2004. The project is expected to restore approximately 9.2 miles of sloughs in an area consisting of 2,068 acres of diked flood plain. The Corps is working in partnership with Clatsop Diking Improvement District and Columbia River Estuary Task Force. The proposed action would restore fisheries access to Blind and Saspal Sloughs, primarily for juvenile salmonids. Implementation of the proposed measures would beneficially impact approximately 5.37 miles of Blind Slough, 2.39 miles of channel in Saspal Slough and 1.09 miles of Anderson Creek.

**Southwest Washington Stream (a.k.a., Lewis and Clark Legacy Streams)**

This project is located beginning about two miles upstream of Chinook, Washington, and extends between river mile 11 and 15. It will examine the biological benefits that would accrue from the replacement of eight culverts along highway 101 that are impeding or blocking access to small tributary streams to the Columbia River, affecting access to 8 miles of former stream and 15 acres of wetlands. Biological assessments are ongoing and the engineering and design is being scoped.

**Julia Butler Hansen National Wildlife Refuge**

The Corps, USFWS and NOAA Fisheries are currently examining the biological benefits that would accrue from the replacement or emplacement of tidegates on eight sloughs within the Julia Butler Hansen National Wildlife Refuge. This project would improve or provide salmonid access to approximately 10 miles of secondary sloughs.

**Chinook River**

The Action Agencies are funding monitoring and evaluation in the Chinook River Watershed in addition to exploring appropriate and viable funding mechanisms for additional restoration in the basin.

## LCREP Habitat Project–Restore habitat in estuary and lower Columbia River

- LCREP is working with the Science Work Group. Three properties have been identified:

  - Acquire and restore wetland habitat on 35 acres on one-half-mile riverfront at Youngs Bay/Walluski River (due Sept 2004).

  - Conserve, restore and protect 400 acres of lowland flood-plain wetlands in Scappoose Bay (due November 2005).

  - Protect and restore 880 acres of spruce swamp wetland, flood-plain channels and emergent scrub/shrub wetlands including 3.0 miles of riparian shoreline in Grays Bay (due May 2005).

## Feasibility Study

- In partnership with the Washington Department of Fish and Wildlife (WDFW), the Corps will complete a feasibility study in 2004 to restore flows to the Steigerwald Lake flood plain, allowing improved fish access/egress and habitat conditions for juvenile salmonids.
- In southwest Washington, the Corps and WDFW will initiate a feasibility study of a project to restore adult and juvenile salmonid access to affected streams, restore a significant portion of 7.6 miles of former stream and 15 acres of wetlands and reconnect upstream and downstream chum salmon supplementation areas. Construction of both projects is planned for 2004–2005.

- The Corps will continue to explore ways to leverage resources with others to support subbasin planning and restoration actions.

### *2005–2008 Work Plan*

In 2005–2008 the Action Agencies will work to complete restoration projects initiated in FY04 and initiate other projects identified and prioritized from the workshop and through ongoing coordination with LCREP and others. In future years, we will continue to seek appropriated funds and cost-share partners and proceed with selection and implementation of other projects identified by the LCREP, Action Agencies and others. Under the GI Study, the Corps continues to investigate options and will recommend appropriate solutions to accomplish ecosystem restoration in the lower Columbia River and estuary. Recommendations may include projects for:

- wetland/riparian habitat restoration,
- stream and fisheries improvement,
- water quality and
- water-related infrastructure improvements.

### *Regional Coordination*

Coordination will take place through LCREP, the Federal Habitat Team and the Council's subbasin planning process.

## Habitat Substrategy 3.4: Subbasin planning and assessment (RPA Actions 154 and 159)

### *2004 Work Plan*

The subbasin planning and research efforts are addressed in this section.

#### Subbasin planning and assessment

- LCREP has proposed a project to "Implement the Habitat Restoration Program for the Columbia River Estuary and Lower Columbia River." This would establish a program to identify on-the-ground habitat restoration projects and plan their monitoring and evaluation. It would also take action on restoration projects already processed and approved through regional and local workgroups (several are listed above under "protect, enhance or restore estuary habitat").
- BPA will continue to fund the LCREP proposal to develop an Aquatic Monitoring Program to address habitat and toxics monitoring needs. The results of this study will be applicable to the overall RM&E effort.

#### Research to develop criteria for estuarine habitat restoration

- The estuary/ocean RM&E Work Group has been established and has developed an RM&E plan and oversee research efforts to help direct planning and restoration activities.
- The Action Agencies will continue to fund appropriate research projects in the estuary identified by the work group, NOAA Northwest Fisheries Science Center and others on salmonid use of the estuary, relevant estuary characteristics and salmon survival through the estuary and plume. Proposals for estuary research in FY04 have recently been reviewed under the Anadromous Fish Evaluation Program (AFEP) of research. RM&E is discussed in greater detail in Section 5.6 of this plan.
- BPA will continue working to develop a conceptual model of the relationship between estuarine conditions and salmon population structure and resilience through a contract with the NOAA Northwest Fisheries Science Center and subcontract with the Oregon Graduate Institute (OGI) of the Oregon Health and Science University (OHSU). Model simulations have revealed several important features relating river flow and bathymetry to habitat opportunity (Action 162).
- The NOAA Northwest Fisheries Science Center has a project, with funding from the Corps, to develop a smaller version of the sonic tag allowing for tagging of smaller fish. BPA is funding a project, titled "Acoustic Tracking of Ocean Survival," to track movement of salmon smolts into the ocean and along the continental shelf to areas of ocean residency. The agencies are working to ensure these efforts are coordinated.
- The Corps is also funding studies, working with NOAA Fisheries, of tagging and tracking technology for the estuary and nearshore environment.

#### LCREP Ecosystem Monitoring Project

- As part of the federal RM&E effort, this project will implement a pilot habitat monitoring program to develop protocols, procedures and indicators for measuring habitat condition for long-term Status Monitoring for both the population/habitat and ecosystem levels (FY04). The population/habitat monitoring is for trends in the status of juvenile salmon and conditions in the habitats they use. The ecosystem monitoring will involve a GIS-based habitat and geomorphic classification system. Based on the results, a long-term habitat monitoring program will be implemented (started FY03, First Report September 2004).

- Additionally, this project will implement a toxic contaminant monitoring program to address issues such as the accumulation of toxic contaminants in sensitive habitat areas, contaminant trends over time and possible impacts on sensitive species. Toxic contaminant concentrations in fish and macroinvertebrate tissues, sediments and the water column will be determined. Based on the results, a long-term toxics monitoring program will be implemented (started FY03, First Report September 2004).

Historic Habitat and Food Web linkages of Juvenile Salmon in the Columbia estuary

- The NOAA Northwest Fisheries Science Center is in the process of reconstructing the historic extent of estuarine and tidal-floodplain habitats (Columbia River mouth to Bonneville Dam) and historic changes in climate, river flow and sediment transport from Astoria to Bonneville Dam. They are also evaluating effects of cumulative changes in bathymetry and flow on habitat opportunity for juvenile salmon, evaluating effects of habitat change and flow regulation on historic and current estuarine food webs that support diverse juvenile salmonid estuarine life histories and evaluating implications of historic habitat change for flow management and habitat restoration efforts in the estuary.

Survival and Growth of Juvenile Salmonids in the Columbia River Estuary and Plume

- The overall goal of this project is to identify the role of the plume in salmonid marine ecology.
- The study will couple physical and biological models looking at the interrelationship between predation, migration, diel movement and estuary and plume fronts (due April 2004).

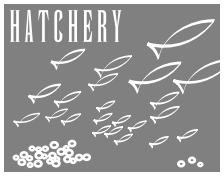
### *2005–2008 Work Plan*

Estuary research will continue, funded through the Corps' CRFM project and BPA. The estuary/ocean RM&E Work Group will continue to work to identify information needs in the estuary and coordinate research activities. The information obtained from these activities will be used to guide future efforts for habitat restoration.

### *Regional Coordination*

BPA and the Corps will continue to rely on LCREP coordination capabilities and membership contacts to coordinate their estuary restoration activities. States, tribes, stakeholders and others are represented in LCREP committees and meetings and benefit from LCREP outreach. The LCREP Science Committee will continue to be an important forum for linking the LCREP program with ESA responsibilities. The Lower Columbia Recovery Board will produce a recovery plan for the mainstem and state of Washington side of the estuary and lower Columbia River. The Action Agencies and NOAA Fisheries participate in this forum along with state representatives and others.

The Action Agencies will continue to work with the states, LCFRB, LCREP and the Council to link estuary and subbasin planning approaches. The Council is providing funding to LCREP to develop the subbasin plans for the Columbia estuary through the LCFRB. In the Columbia Estuary subbasin, BPA, the Corps and LCREP are conducting a project to assess and map habitat in the lower Columbia River.




## 5.3 Hatchery Priorities

Hatchery actions in 2004–2008 may be influenced by pending NOAA Fisheries hatchery policy and new hatchery BiOps, subbasin plans, Hatchery Genetic Management Plans (HGMPs), and the Council's Artificial Production Review Evaluation (APRE). As these are completed, priorities will be adjusted as needed.

### *Five-Year (2004–2008) Outcomes*

Hatchery action priorities over the next five years include:

- Plan and implement safety-net contingency plans as needed for artificial propagation actions to avoid extinction of critically depressed ESA listed salmon and steelhead populations;
- Develop and implement new or revised HGMPs to clarify goals and objectives and guide implementation of hatchery reforms to benefit listed fish;
- Develop and implement a comprehensive marking plan through collaboration with the regional fishery managers;
- Support other artificial production activities that contribute to tribal and non-tribal fisheries, including ongoing programs and potentially new programs that improve harvest opportunities while not adversely affecting the listed evolutionarily significant units (ESUs);
- Support hatchery-related RM&E efforts (see also the RM&E section 5.6) focused on increasing our understanding of the effects of hatchery programs on natural production and harvest, the contribution of hatchery programs in recovery efforts and the effectiveness of hatchery reform and safety-net actions.

The locations of FCRPS mitigation hatcheries are shown in Figure 2.0.


*Figure 2.0 Locations of FCRPS mitigation hatcheries.*

## Hatchery Strategy 1: Implement a Safety-Net Program as an Interim Measure to Avoid Extinction

BPA initiated the Safety Net Artificial Production Program (SNAPP) in 2001 by working with NOAA Fisheries and the USFWS to scope out the program and determine how best to implement the program over the next few years. The scoping effort resulted in BPA funding a Safety Net Coordinator to facilitate the four-step planning process for the Safety Net Program.

- Perform extinction risk analysis on depressed fish populations
- Develop intervention options and a recommended strategy
- Perform benefit-risk analysis on options to determine the recommended strategy
- Develop Hatchery and Genetic Management Plans (HGMPs) to guide implementation

The SNAPP Coordinator convened an oversight group comprised of the relevant parties (states, tribes, NOAA Fisheries, USFWS and BPA) to provide oversight and help implement the program. That group reviewed the initial list of 10 "at risk" populations identified in NOAA Fisheries RPA Action 175 and recommended an expanded, more comprehensive list of 38 populations. To integrate SNAPP with the Council project review and selection process, the SNAPP Coordinator prepared a consolidated SNAPP proposal and submitted it to the Mountain Snake Provincial Review in late 2001. The proposal was revised in response to the ISRP comments and resubmitted to the Council in mid-July 2002. As result, the SNAPP process was more closely aligned with the Interior Columbia TRT's work efforts and the extinction risk analysis became dependent on completion

of population delineations by TRT. The TRT's work products were provided to the SNAPP extinction risk analysis contractor in March 2003. The first step of the SNAPP planning process is addressing the 77 salmon and steelhead populations identified by the TRT.

### *Five-Year (2004–2008) Outcomes*

The safety-net program is intended to provide artificial propagation contingency plans that, if implemented, would prevent further decline in the status of the most at-risk ESA-listed species and would buy time for other recovery measures to take effect. The program would intervene with artificial production for severely depressed and declining populations when and only when such strategy is determined to be necessary, effective and feasible using a prescribed four-step analytical process. In coordination with NOAA Fisheries and the Council, we will also continue to support existing safety-net projects (supplementation, captive rearing and captive broodstock) intended to conserve listed species.

### *2004 Work Plan*

Develop safety-net contingency plans

- BPA will continue funding the SNAPP process to develop safety-net contingency plans. The first step of SNAPP (extinction risk analysis) is expected to be completed in 2004. The threshold criteria developed through the SNAPP process will be used to determine which populations, if any, proceed to the remaining SNAPP planning steps.

Implement ongoing safety-net projects

- BPA will continue to implement ongoing safety-net projects to avoid extinction of several populations of Snake River spring/summer Chinook salmon and the Snake River sockeye salmon population and other listed stocks.
- Although these projects were initiated through the Council's Fish and Wildlife Program prior to issuance of the NOAA Fisheries BiOp, they are precisely the type of artificial propagation safety-net project envisioned in the BiOp's safety-net actions (action 175–178). Accordingly, the Action Agencies have associated these ongoing safety-net projects with action 177 (implementation of safety-net projects).

### *2005–2008 Work Plan*

As revised, SNAPP will now rely on delineation of populations and population components of the Interior Columbia TRT. The SNAPP contractor(s) will participate in the population viability subgroup of the TRT to ensure all of the relevant population status and life history information is available for analysis, to assist in extinction risk analyses and to develop a threshold of "excessive risk of extinction" that would guide moving on to the later steps of SNAPP and to be later incorporated into any contingency plan to trigger the regional consideration of actual implementation. This threshold would be scientifically linked with TRT thresholds for extinction. Should SNAPP recommend that some populations are at "excessive risk of extinction" and a BPA/NOAA Fisheries decision is made to proceed into the subsequent SNAPP steps, then appropriate co-managers, subbasin planners and TRTs would be notified of populations' extinction risk and be provided with supporting information. SNAPP would outline conservation options involving artificial production to reduce short-term risk of extinction, conduct a benefit/risk analysis of options using peer-reviewed methods and develop contingency plans using the established HGMPs template.

A contingency HGMP for the at-risk population would include a risk trigger that, if met, would initiate regional consideration and decision on whether to actually implement a contingency plan. Contingency HGMPs would be circulated for scientific and policy review. After review, the final HGMP would be provided to appropriate subbasin planners (for appending to their plans or for review for consistency with completed subbasin plans), NOAA Fisheries and TRTs. At this point, SNAPP contributions with this particular population would be complete. This process should be completed by late FY04 or early FY05.

If a regional decision is made to implement a safety-net project as an interim measure to avoid extinction of a listed population, we will provide funding to initiate and sustain the project. The NOAA Fisheries–approved contingency HGMP would be used to guide implementation. The Action Agencies will provide appropriate funding to support such projects, using the Provincial Review process or other appropriate processes, such as targeted solicitations or direct procurements if necessary (due to scheduling constraints, for example).

BPA will continue to fund the ongoing safety-net programs for Tucannon River and Grande Ronde spring Chinook programs, including necessary facility modifications, through the Council's Fish and Wildlife Program. BPA will also continue to fund the safety-net programs for Snake River (Redfish Lake) sockeye salmon and Salmon River spring/summer Chinook salmon through the Council's Fish and Wildlife Program. All of these programs will be administered under the guidance of the NOAA Fisheries ESA Section 10 Permits.

BPA will use the approach developed through RPA Action 178 to quickly make funds available for planning and implementation of any additional artificial production

program deemed necessary by the SNAPP process during the term of the NOAA Fisheries BiOp. This approach will rely upon existing procedures and emphasize those that will expedite the process (*e.g.,* use of mid-year reallocation and targeted solicitations).

### *Regional Coordination*

Technical Recovery Teams, subbasin planning, Council, Artificial Production Review Evaluation.

## Hatchery Strategy 2: Reduce Potentially Harmful Effects of Artificial Production to Aid Recovery Through Hatchery Reform

The Action Agencies will continue to support the development of new or updated HGMPs to identify methods to reduce harmful hatchery practices and/or aid recovery of listed fishes through hatchery reform. For hatchery programs targeted at ESUs, this HGMP planning process will allow us to determine whether a hatchery program can contribute to recovery of listed species through the modification of existing practices or facilities. We will continue to support these programs as guided by HGMPs and through the SNAPP process for particularly "at-risk" stocks. For non-ESU hatchery programs the purpose of the HGMP is to assure the programs do little harm to listed ESUs. We will continue to support the basinwide development of FCRPS HGMPs until completion. The results of HGMPs, BiOps, the APRE and subbasin plans will be integrated to guide changes in facilities and/or hatchery operations.

Hatchery reform activities identified in NOAA Fisheries-approved HGMPs and BiOps may take many forms, including but not limited to, changes in broodstock selection, hatchery rearing practices and release strategies. We expect that these reforms will lead to increased beneficial effects and decreased negative effects on listed species, thereby contributing to recovery.

For facilities owned or funded by the Action Agencies, we will begin funding hatchery reforms that may already be specified by existing HGMPs or hatchery BiOps and additional modifications as they become identified in HGMPs. Changes that consist of significant alterations in facilities will require extensive planning. Changes that may result in significant adjustments to the operation of the program may take far-reaching negotiations among fisheries co-managers. We are supporting processes and funding mechanism to implement these changes as soon as possible.

The HGMP process has been split into three phases. Phase I is a compilation of goals, objectives and operations of how the hatchery program is functioning. Phase II entails a negotiated vision among co-managers of how the hatchery will operate in the future. Phase III will be an ESU-wide review and coordination with the Technical Review Team, subbasin plans, U.S. v. Oregon, etc., concluding with revision and review/approval of NOAA Fisheries and/or USFWS. Because adequate review requires consideration of cumulative effects, all HGMPs relevant to a given ESU will need to complete Phase II before they can be reviewed holistically in Phase III.

Although we expected to make some progress in 2003, the process was delayed and most improvement to hatchery practices and facilities will probably be initiated in 2005 and 2006. Phase II of the HGMP process is scheduled to produce reviewable HGMPs for submission to NOAA Fisheries by March 2004. NOAA Fisheries review and approval will be completed as expeditiously as possible, after which time hatchery reforms can be implemented.

### Hatchery Substrategy 2.1: Develop HGMPs

#### *Five-Year (2004–2008) Outcomes*

In mid-2004, the Action Agencies expect final Phase III HGMPs, approved by NOAA Fisheries, to be ready for prioritization of reform actions and implementation.

Depending on the complexity of the programs and negotiations among fisheries co-managers and the difficulty in TRT and NOAA Fisheries review of the future direction of the hatchery program, the target date for completion of final Phase III HGMPs, approved by NOAA Fisheries, is May 2004. Individual HGMPs will indicate needed hatchery reforms and potential funding sources. Hatchery operators and fish co-managers will then have the opportunity to address funding issues by prioritizing reforms among hatcheries and seeking funding from appropriate entities.

#### *2004 Work Plan*

##### Complete HGMPs

The Action Agencies will complete draft Phase II HGMPs by December 2003 and Phase III HGMPs by May 2004.

##### Fund HGMP identified actions

Fund actions identified in completed HGMPs that can be implemented as prioritized in the short planning timeframe allowed. A substantial number of potential hatchery reform actions in the draft Phase III HGMPs are likely to be approved by NOAA Fisheries. The Action Agencies propose the following funding prioritization criteria, to achieve the greatest biological benefits as rapidly as possible:

- The hatchery program considered for reform must be funded by BPA (*i.e.,* it must be an artificial propagation program at an LSRCP, Reclamation, Corps, or Council Fish and Wildlife Program hatchery facility).

- The hatchery reform actions must benefit one of the eight ESUs jeopardized by the FCRPS. Reform actions affecting those ESUs in greatest jeopardy are highest priority.
- Based on the best available science, the reform action must have a clear biological benefit to a population or populations in the jeopardy ESU. Those actions with the greatest certainty to provide biological benefits or reduce biological risks are highest priority.
- Reform actions should include adequate monitoring and evaluation to measure benefits and assess progress in meeting performance standards.
- Actions that meet the above criteria will also be prioritized based on cost effectiveness, *i.e.,* actions that achieve similar biological benefit at lower cost will receive higher priority.

Implement priority reforms

Priority reforms identified will be funded as expeditiously as possible. Implementation will require extensive coordination with federal, state and tribal operators of the hatchery facilities, the U.S. v. Oregon process and subbasin planning. The Action Agencies will also coordinate implementation of these priority reform actions as closely as possible with the Council's planned APR implementation process.

### *2005–2008 Work Plan*

The Phase II HGMP process should be completed by March 2004. As HGMPs are completed (or other information that is relevant to changes are available, for example, BiOp recommendations), the Action Agencies will begin implementation of identified reforms consistent with RPA Actions 171, 172 and 173. The specifics of implementation will vary by program and type of reform and will require prioritization in accordance with HGMPs, all ongoing hatchery recommendations and subbasin planning. Funding reforms may involve new authorizations or appropriations, or BPA funding when appropriate, using the Provincial Review process or other applicable processes, such as targeted solicitations or direct procurements (due to scheduling constraints, for example). The Action Agencies expect to make significant progress in funding reforms that do not require major construction activities for the most at-risk species by 2005 to 2006.

### *Regional Coordination*

Technical Recovery Teams, subbasin planning, Council, U.S. v. Oregon, Artificial Production Review Evaluation.

## Hatchery Strategy 3: Contribute to the Development and Implementation of a Comprehensive Marking Plan

### *Five-Year (2004–2008) Outcomes*

The Action Agencies have worked with key regional federal, state and tribal harvest management parties to establish an oversight group to oversee development of a regional fish marking plan. The original purposes of such a plan being called for in the BiOp (RPA 174) were several and included enabling mark-selective fisheries (thus making it possible to conduct fisheries and potentially reduce overall impacts on listed fish in those fisheries). In addition, to reduce the critical uncertainty with respect to the status of many listed populations, it was necessary to improve the ability to distinguish between natural and hatchery origin spawners in the escapement over time. Since the parties involved began collaborating on this assignment in early 2001, a number of events and circumstances have transpired that required NOAA Fisheries and the collaborating parties to reconsider and modify original objectives and associated priorities.

Among the major factors affecting the changes is the widespread trend, within and outside the Columbia Basin, to begin implementing mass marking and mark-selective fisheries using the adipose fin clip. That particular mark had long been used solely to indicate the presence of a coded wire tag (CWT). This development has necessitated a general retooling of the CWT/ad clip and associated visually based CWT recovery system to attempt to maintain the coastwide viability of the CWT program. For example, many fishery and hatchery escapement sampling programs must now rely on Electronic Tag Detection technology to recovery CWTs. The viability of the CWT system is a major concern, as there is little doubt that mass marking and mark-selective fisheries have greatly affected our information systems.

The extra-regional nature of this problem, especially in regard to mixed-stock ocean fisheries and the ability of fishery managers coastwide to rely on the CWT program as the primary fishery management and stock monitoring system, has led the Pacific Salmon Commission (PSC), through its Selective Fisheries Evaluation Committee, to evaluate and provide recommendations on how best to ensure the future viability of the coastwide CWT systems. Through that effort, protocols are being formulated and implemented to guide mass marking and mark selective fishery sampling procedures. The work occurring under the auspices of the PSC and its participating entities is still underway, and has been occurring concurrently with BiOp implementation. It already has resulted in a number of changes in the traditional CWT system, yet some of the challenges to the CWT program

viability have not yet been fully resolved. In many respects, the results of the PSC effort serve largely to overlay the plans called for in this RPA, at least as it relates to Chinook and coho salmon, necessitating careful coordination between the two undertakings.

Another more recent event affecting implementation of the intent of this RPA is recent federal legislation requiring the mass-marking of all salmon and steelhead released from federal or federally funded hatcheries produced for the purposes of harvest. This legislation largely answered the question of whether to mass mark hatchery production, for much of the harvest-oriented production in the Columbia Basin. However, the legislation exempts production for supplementation purposes, an increasingly common usage of hatchery production in the Columbia Basin, from the requirement for mass marking. In many cases, the question of whether production is for harvest or supplementation purposes is not immediately evident, and in fact production can involve both purposes. Thus, a comprehensive marking plan that will both comply with the law and accomplish the original purposes of this RPA must be sufficiently flexible to appropriately address marking requirements on a case-by-case basis. All of these events/issues have led the marking strategy oversight group to redefine the focus and expectations toward two areas of immediate interest to listed fish in the Columbia River Basin. These topic areas are harvest management infrastructure and the issue of distinguishing between natural and hatchery fish in the escapement. The status of this effort is manifest in the release of the Draft Review of the Coded Wire Marking Program for Columbia Basin Hatchery Salmon and Steelhead: Phase I in October 2003. The marking strategy oversite group will meet in late November 2003 to review the draft and make recommendations for developing specific marking strategies and compile them in a final Phase II work plan for application to all of the artificial production facilities in the Basin. This work is expected to occur during 2004, with the final Phase II work plan developed and reviewed within that timeframe.

### *2004 Work Plan*

Basic sequential elements needed to develop the marking plan include:

1. Finalize draft Phase I Review of the Coded Wire Marking Program for Columbia Basin Hatchery Salmon and Steelhead;
2. Consider extra-regional efforts to address marking issues and determine next steps to complete Phase II Work Plan;
3. Define work statement for contract to write plan;
4. Produce plan;
5. Review plan and make changes as appropriate via marking strategy oversight group;
6. Conduct cost analysis on marking plan;
7. Identify resource base(s) for plan implementation.

### *2005–2008 Work Plan*

Implement plan at applicable production fisheries and facilities through appropriate regional funding processes. Periodic review and modification is expected to occur during the 2005–2008 timeframe.

### *Regional Coordination*

This strategy defines a regional coordination process as outlined in NMFS RPA 174. It includes regional coordination with the Action Agencies, NOAA Fisheries, USFWS, ODFW, WDFW, Idaho Department of Fish and Game (IDFG), Pacific States Marine Fisheries Commission (PSMFC), Pacific Salmon Commission, Columbia River Inter-Tribal Fisheries Commission (CRITFC) and individual treaty tribal participation.

## Hatchery Strategy 4: Artificial Production in Support of Tribal and Other Harvest, Consistent with the Needs of Listed Fish

### *Five-Year (2004–2008) Outcomes*

Some of the loss of fishery opportunities due to the FCRPS is now and will continue to be mitigated for through hatchery production. As partial mitigation for the loss of these fishery opportunities, we will continue to support hatchery programs that provide meaningful harvest opportunities. This will be done under guidance of NOAA Fisheries–approved HGMPs to ensure that artificial production for harvest does not unacceptably impede recovery of ESA-listed species or ESUs.

### *2004 Work Plan*

<u>Continue hatchery funding</u>

- Subject to any changes recommended in new/revised HGMPs, the Action Agencies will continue to fund hatchery projects operated in conformity with the ESA. These hatcheries include eleven Lower Snake River Compensation Plan hatcheries, eight Corps hatcheries, and three Reclamation hatcheries (operated as Grand Coulee Dam mitigation).

### *2005–2008 Work Plan*

The Action Agencies will continue to operate legally mandated FCRPS mitigation hatchery projects in conformance with the ESA through 2008. BPA plans to

continue to fund operation and maintenance of a number of experimental and production hatchery facilities as recommended by the Council's Fish and Wildlife Program. Upon completion of NOAA Fisheries–approved HGMPs directed at hatchery reform measures (see Hatchery Strategy 2), the Action Agencies will begin implementation of the high-priority reform measures at FCRPS mitigation hatcheries and the Council's Fish and Wildlife Program hatcheries.

### *Regional Coordination*

Council, subbasin planning, Technical Recovery Teams, Artificial Production Review Evaluation, U.S. v. Oregon.


## 5.4 Harvest Priorities

The Action Agencies concur with NOAA Fisheries about the potential for immediate benefits to listed species from harvest reform measures while enabling continued harvest of stronger stocks by tribal and non-tribal fisheries. The harvest strategies seek to improve adult life-stage survival through measures that will directly or indirectly reduce the take of listed species in the near term and will advance harvest reforms, for application over the longer term. Efforts will continue to improve the efficacy of harvest management by improving the information upon which harvest management decisions are made. These efforts will contribute to offsite mitigation goals for FCRPS impacts by providing important adult life-stage survival improvements that will contribute to long-term recovery. The Action Agencies will work closely with NOAA Fisheries and the salmon managers to identify and implement actions that enable reductions in take of listed species consistent with harvest RPA actions of the BiOp.

The Action Agencies will place highest priority on harvest-related actions that provide (1) the greatest relative survival benefit, (2) to ESUs most affected, and (3) to ESU's in greatest need of survival improvement. Further, the Action Agencies will quantify expected adult life-stage survival benefits associated with the action to be applied toward Tier 2 performance.

### Harvest Strategy 1: Develop fishing techniques to enable fisheries to target non-listed fish while reducing harvest-related mortality on ESA-listed species

Overall priorities under this strategy in 2004 include:

- Continuing ongoing projects to develop and evaluate selective and select-area fisheries below Bonneville Dam for application in lower river commercial fisheries.
- Development and implementation of an additional project above Bonneville Dam to reduce steelhead mortalities incidental to the fall Chinook fishery in Zone 6, potentially through use of weed-line modifications to conventional gillnets. If agreement with NOAA Fisheries and tribal anglers is achieved, then his study may be considered for potential funding utilizing the within-year process of the Council's Fish and Wildlife Program.
- Working with tribal, state and federal representatives through longer term regional processes to identify and develop other opportunities to improve survival of listed species and other weak stocks through harvest reforms.
- Initiate dialogue with treaty tribes to develop principles regarding the development of value added fisheries through mechanisms including the use of short term conservation easements when excess fishing capacity, poor market conditions, and surplus fishery allocation exist.

### Harvest Substrategy 1.1: Gear efficacy testing and fishery integration on the mainstem Columbia/Snake rivers

#### *Five-Year (2004–2008) Outcomes*

Working with the harvest managers, the Action Agencies anticipate by 2005 at least one fully-tested peer reviewed selective fishery project integrated into commercial fisheries, resulting in a decrease in impacts on weak stocks. The Agencies' two areas of initial focus are below Bonneville Dam non-treaty commercial fisheries targeting spring Chinook and above Bonneville Dam treaty commercial fall season Chinook fisheries (with primary objective of reducing incidental impacts to steelhead). As new gears are developed, particular emphasis will be placed on the transfer of technology from applied research to fishery integration and evaluation to facilitate effective implementation of additional deployment of selective fisheries by 2007.

#### *2004 Work Plan*

- **Completion of lower river tooth-tangle net fishery** (BPA 2001-007-00). 2003 was the third year of this project to test and evaluate the use of smaller meshed tooth-tangle nets in the lower river commercial fishery. Researchers and managers have monitored the testing and evaluation of tooth-tangle nets of varying strata and deployment strategies with mixed results. Approximately 22,000 steelhead were unexpectedly intercepted during the 2002 Chinook fishery. This led to the addition of steelhead handling evaluation for the 2003 season. Program

sponsors will continue investigations into this gear into 2004 with research results available by early 2004. A final determination of the benefits of this fishery will be determined after peer reviewed evaluation of the results and conclusions occur.

- For fall 2004 fisheries, NOAA Fisheries in coordination with the Action Agencies will **pursue testing of weed-line modifications on conventional gillnets** fished in Management Zone 6 with the purpose of reducing incidental catch of steelhead during the commercial fall Chinook fishery. These types of gear modifications take advantage of the differential water column migration patterns of Chinook and steelhead. These modifications hold promise to reduce listed summer steelhead impacts while maintaining a viable treaty fishery targeting fall bright Chinook. If an agreement is reached with parties to this fishery, a small controlled study of weed-line modified gill net will be pursued to determine its feasibility, effectiveness, and costs as an alternative gear type in this fishery.
- Continue implementation, within the fall treaty commercial fisheries, of the NOAA Fisheries **net exchange program** as an ongoing management tool to reduce steelhead interceptions while increasing Chinook harvest under current impacts. Catch statistics suggest that the increased use of nine-inch gillnets has allowed Zone 6 fishers to access over 11,000 additional fall Chinook within the prescribed steelhead harvest limit. Similar benefits can be expected in future years when Chinook surpluses are similarly large. In years where Chinook surpluses are smaller, the use of nine-inch nets can be expected to reduce steelhead impacts below prescribed limits and/or provide more scheduling flexibility for Zone 6 fisheries.
- Continuation of the **Select Area Fishery Evaluation program** (BPA 1993-060-00). This program will enter its 10th year of testing and evaluation with a final report delivered to the Council by spring 2004. This fishery provides opportunity for a terminal fishery on non-listed fish that reduces fishing pressure and associated incidental take of listed species is more conventional mixed stocks fisheries.

### *2005–2008 Work Plan*

Implementation of actions identified for 2004, described above, will continue during 2005–2008 based on their effectiveness in reducing incidental take of listed species during fisheries targeting stronger stocks. Additional projects may be added to the list of gear efficacy testing projects for 2005–2008, based on agreements among salmon managers, NOAA Fisheries and the Action Agencies, including opportunity for funding.

All selective fisheries utilizing live-capture techniques are premised on the resolution of the important Coded Wire Tag (CWT) database modeling issues arising from mark-selective fisheries as per Harvest Substrategy 2.2. The schedule and implications are discussed in that section.

As various gear types and methodologies are developed through Action Agency involvement, any biological survival benefit measured or derived from indirect approaches will be credited under RPA Action 168.

### *Regional Coordination*

New application of gear types in the Columbia basin must be compliant with Harvest Substrategy 1.2; specifically, the ability to provide both immediate and long-term fishery specific mortality rates for purposes of quantifying gear impacts. Any Action Agency funded gear efficacy studies will be assessed by NOAA Fisheries, other federal agencies, states and tribes through U.S. v. Oregon and/or the Council's Fish and Wildife Program before full integration as a management activity.

Currently, impacts resulting from 2002 testing of the tooth-tangle fishery are being reviewed within the Technical Advisory Committee of U.S. v. Oregon management process. Changes and adaptations to that program will primarily occur within that process, with input from outside reviewers once final reports of annual research are completed.

## Harvest Substrategy 1.2: Research to address incidental mortality in selective fisheries

### *Five-Year (2004–2008) Outcomes*

A major biological issue pertinent to developing and implementing selective fisheries in the Columbia basin is the ability to determine immediate and delayed (pre-spawning) non-retention mortality rates on non-targeted stocks. The amount of non-retention mortality will determine the efficacy and feasibility of selective fisheries in reducing harvest mortality on specific stocks and thus contribute to rebuilding weak stocks.

As part of our objective under Harvest Substrategy 1.1, the Action Agencies expect to have all relevant incidental mortality assessments already part of current gear testing complete, reviewed and integrated into any decision process associated with full implementation fisheries by 2005. Our current focus is the lower river tooth-tangle study (BPA 2001-007-00).

Additional focus should be placed on the catch-and-release sport fisheries below Bonneville Dam and fall-out mortality in Zone 6 treaty fisheries. This is particularly important when

there are sufficient adult returns to support relatively higher harvest rates. If agreement with NOAA Fisheries and the salmon managers is achieved, then associated studies may be considered for potential funding utilizing the within-year process of the Council's Fish and Wildlife Program. Additionally, future studies should involve studies to determine the impacts of multiple recaptures associated with multiple selective live-capture fisheries implemented in sequence through fisheries that are upstream of one another. Results from these studies will provide information for comprehensive assessment of the true impact of selective fisheries.

#### *2004 Work Plan*

For 2004, the Action Agencies will complete research to determine the non-retention mortality using tooth-tangle net gear (BPA 2001-007-00).

#### *2005–2008 Work Plan*

Non-retention mortality studies using tooth-tangle gear will complete its evaluation of the third year of research. The Action Agencies may pursue additional studies to measure the impact of fish handling associated with multiple selective live-capture fisheries implemented in sequence through fisheries that are upstream of one another. Results from these studies will provide information for comprehensive assessment of the true impact of selective fisheries.

#### *Regional Coordination*

Currently, impacts resulting from 2003 testing of the tooth-tangle fishery are being reviewed within the Technical Advisory Committee of U.S. v. Oregon management process. Changes and adaptations to that program will primarily occur within that process with input from outside reviewers once final reports of annual research are completed.

## Harvest Strategy 2: Improve Harvest Management Assessments, Decisions, and Evaluations

Under this strategy, the Action Agencies will lend coordination assistance and provide appropriate resources through cost-sharing mechanisms to contribute toward efforts by the fishery managers to improve the methods and analytical procedures used to estimate fishery and stock-specific parameters in support of more effective harvest management. Improved estimates of escapement and other critical population data that are critical for effective harvest management will occur through support of projects directed at identifying and addressing important data gaps. In some cases, specific field studies and analytical work may be necessary to address the gaps and ultimately provide the increased resolution required to manage and monitor fisheries in the context of listed populations.

### Harvest Substrategy 2.1: Improved escapement assessments and other critical population-specific data to support conservation-based harvest management

#### *Five-Year (2004–2008) Outcomes*

Areas of focus will include improvement in catch sampling programs and escapement estimation, development of improved population discrimination techniques, and the development of new harvest management models to improve the efficacy of preseason and in-season harvest management. As other investigations into hooking mortality and other sources of unaccounted loss report results, the Action Agencies will present that information to fishery managers for appropriate integration into harvest assessment models to improve estimates of model parameters.

#### *2004 Work Plan*

Prioritize harvest information needs

- Assist NOAA Fisheries and fishery managers in developing a prioritized list of harvest management information needs that can be addressed through future projects and that hold promise of reducing the impacts of unvalidated assumptions, dated information, or information gaps on listed fish used in developing annual and seasonal harvest management regimes. Areas of focus will include improvement in catch sampling programs and escapement estimation, development of improved population discrimination techniques, and the development of new harvest management models to improve the efficacy of pre-season and in-season harvest management. Funding has been provided for the Nez Perce Harvest Monitoring Program (BPA 2002-060-00) for FY 2004. This project should contribute to the aforementioned harvest management information objectives in both fishery management zone 6 and in usual and accustomed fishing areas in the Snake River basin.

#### *2005–2008 Work Plan*

This substrategy has relationship to other strategies, including Harvest Substrategy 1.2 and Hatchery Strategy 3. Integration among these strategies is important for consistency in implementing this work plan.

### *Regional Coordination*

Council's Fish and Wildlife Program, U.S. v. Oregon.

### Harvest Substrategy 2.2: Alternative modeling systems that work in the context of selective fisheries

The Action Agencies have decided to incorporate the outcomes of this substrategy with other harvest substrategies. Harvest substrategy 2.2 will be deleted in future implementation plans.

### Harvest Substrategy 2.3: Identify sources of unaccounted harvest-related mortality

#### *Five-Year (2004–2008) Outcomes*

The Action Agencies will pursue additional analysis to determine and/or further refine estimates of incidental mortalities from fishing gear and handling. Additional studies will be funded through the Provincial Review process.

This strategy relates to Harvest Substrategy 1.2. All incidental gear-type mortality studies and schedules identified above are referenced here to describe how this work fits together in the general harvest work plan.

#### *2004 Work Plan*

Lost gillnets report

- Finish report of research into the feasibility of locating, marking and removing lost gillnets within Bonneville and The Dalles reservoir.

#### *2005–2008 Work Plan*

- Continue to review project proposals addressing this substrategy submitted in the Council's Fish and Wildlife Program or subsequent subbasin planning process.
- Identify any additional high priority fisheries in which unaccounted harvest-related mortality may not be adequately addressed. Fund studies as appropriate.
- Identify high priority fisheries within Columbia Basin where incidental mortality estimates are highly uncertain or not available. Develop research proposals to quantify impact. Conduct field research to estimate loss. Analyze and publish results. Incorporate results into in season management.

#### *Regional Coordination*

Council's Fish and Wildlife Program, U.S. v. Oregon.

## Harvest Strategy 3: Support Sustainable Fisheries for the Meaningful Exercise of Tribal Fishing Rights and Non-tribal Fishing Opportunities Consistent with the Recovery Effort

### Harvest Substrategy 3.1: Value-added projects

#### *Five-Year (2004–2008) Outcomes*

Selective live capture fisheries can produce catches that are of higher value than conventional fisheries, as shown by results of the 2001 and 2002 lower Columbia River tooth-tangle net study (BPA 2001-007-00). Live capture gear and associated methods result in a better quality caught fish due to increased freshness and less external net marks when compared to a conventional gillnet. Future non-treaty spring Chinook commercial fishery's in 2004 and beyond are also expected to achieve higher value through the continued use of live capture gear and methods.

Other non-gear related measures may also contribute to sustainable fisheries, include price supports, value-added processing or other programs. The Action Agencies will pursue economic development strategies in 2004 with a focus on treaty fisheries. It is possible that value-added fishery benefits in the form of price supports could be a negotiated part of gear testing projects provided they result in the decrease in take of listed species.

#### *2004 Work Plan*

Value-added fisheries discussions

- Continue ongoing discussions with interested parties regarding value-added fisheries. Our approach so far has been to link objectives under effort reduction programs with value-added strategies to establish a resource base. This will enable parties to develop tailored marketing strategies to address increasing competition from farmed salmon and varied consumer demand.

Support decision-making

- Complete work to develop a principles paper ("white paper") that will assist in shaping policy to guide decision-making.

#### *2005–2008 Work Plan*

- Work with interested parties on principles to develop economic development strategies.
- Outline alternate strategies identifying opportunities within specific fisheries and/or salmon stocks.

- Coordinate work products with key policy personnel.
- Execute agreements as appropriate within 2005–2008 timeframe.

#### *Regional Coordination*

Council's Fish and Wildlife Program.

### Harvest Substrategy 3.2: Potential alternative/terminal fishing locations

#### *Five-Year (2004–2008) Outcomes*

The Action Agencies will assess and inventory additional terminal locations above Bonneville Dam that provide potential for reducing ESA impacts from mainstem fisheries. Preliminary sites include, but may not be limited to, the Little White Salmon and Klickitat rivers, and Eagle Creek. The Action Agencies will also review of sites through appropriate processes and develop new sites as appropriate. Existing terminal fishing projects will be continued to provide fishing opportunities in the Lower Columbia River.

#### *2004 Work Plan*

Provide terminal fishing opportunities

- The Action Agencies will continue to provide additional hatchery production and terminal fishing opportunities in the lower Columbia River (BPA 1993-060-00) for coho and Chinook at Youngs Bay, Deep River, Tongue Point, South Channel, Prairie Channel, Steamboat Slough and Coal Creek Slough sites.

Prioritize terminal fishing locations

- The Action Agencies will work with the states, tribes, and interested parties to develop a prioritized list of potential new terminal fishing locations. Land and production issues related to each potential new location will be identified.

#### *2005–2008 Work Plan*

- Determine resource requirements needed to develop sites from list.
- Decide basic course of action using existing regional coordination entities.

#### *Regional Coordination*

Council's Fish and Wildlife Program.

### Harvest Strategy 4: Fishery Effort Reduction Programs

#### *Five-Year (2004–2008) Outcomes*

By the end of the five-year cycle, the Action Agencies will implement at least one fishery effort reduction program resulting in a decrease in harvest impact to listed fish that is quantifiable and creditable under RPA Action 168.

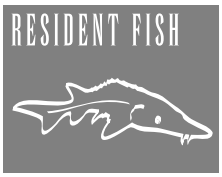
#### *2004 Work Plan*

Reduce harvest impacts on ESA-listed fish

- The Action Agencies will continue to pursue opportunities for reducing harvest impacts on listed species. These may include agreements that reimburse commercial harvesters for reducing their catch or not fishing, thus creating increased abundance that can be passed through other fisheries to the spawning grounds.
- As a starting point, the Action Agencies are developing a principles paper to assist negotiations in this topic area.

#### *2005–2008 Work Plan*

- Work with interested parties on principles to develop effort reduction programs.
- Outline alternate strategies identifying opportunities within specific fisheries and/or salmon stocks.
- Coordinate work products with key policy personnel.
- Execute agreements as appropriate within 2004–2007 timeframe.




## 5.5 Resident Fish Priorities

### Resident Fish Strategy 1: Promote the Reproduction and Recruitment of Kootenai River White Sturgeon (KWS)

The Action Agencies' strategy is to improve the population's ability to produce juveniles and to help ensure that those progeny grow to maturity. This will be accomplished through two complementary substrategies, one that focuses on natural production of KWS, and another that uses artificial production to maintain the population until natural production is self sustaining. Outcomes, priorities, work plans, and FY04 deliverables are described below for each substrategy.

Regional coordination will occur primarily through the KWS Recovery Team. Additional coordination will occur

through NEPA processes (*e.g.,* the Upper Columbia interim environmental assessment [EA], and environmental impact statement [EIS]), Council/BPA Fish and Wildlife Program processes, subbasin planning, and technical forums (*e.g.,* International Kootenai/Ecosystem Rehabilitation Team).

## Resident Fish Substrategy 1.1: Create conditions below Libby Dam that facilitate KWS natural reproduction and juvenile survival

### *Five-Year (2004–2008) Outcomes*

Under this substrategy, we identify the factors limiting natural production and survival to age one of juvenile KWS and, to the extent possible, manage the Kootenai River to overcome those limits. Two primary outcomes are desired during this period:

1. Libby Dam will be able to safely and regularly pass the quantities, temperatures, and flow rates of water needed to facilitate natural recruitment of KWS, or if significant modifications are required at Libby Dam (*e.g.,* additional generating units, and/or spillway modifications) or at downstream flood-sensitive areas (*e.g.,* integrity of levees), then those modifications will be close to completion by 2007. This assumes that local sponsorship for levee rehabilitation is found, or funding can be obtained for generating units. Of course, this prescription also assumes that high flows are among the factors conclusively identified as necessary for sturgeon recruitment as a result of outcome 2.
2. Studies will have intensively investigated, and perhaps identified, the factors that limit recruitment of naturally spawned KWS progeny to age one. Present preliminary results indicate that something prevents survival of the eggs and/or larval sturgeon in years when natural spawning occurs.

These primary outcomes will depend on steps and intermediate outcomes described below.

### *2004 Work Plan*

The first outcome (Libby flows) will be accomplished through one or more of at least three alternatives that are being explored and evaluated concurrently. One alternative involves providing the quantity of water (see the *2003/2003–2007 Implementation Plan*); the others involve passing that quantity at prescribed flow rates at Libby Dam. In 2004, the Action Agencies will continue to work on evaluating and producing reports on these alternatives. Specific 2004 projects include:

- **VarQ.** The Corps and Reclamation will make a decision by winter 2006 whether to implement VarQ on a long-term basis. This will be based on results of the Upper Columbia Alternative Flood Control (VarQ) and Fish Operations EIS currently being prepared to evaluate the effects of VarQ and fish flows being implemented in a combined operation at Libby and Hungry Horse.
- **Early volume runoff forecasting.** The Corps will complete its evaluation and implement an early forecasting procedure using the Southern Oscillation Index of ocean temperature conditions to facilitate flexibility in Libby drawdown.
- **Variable December drawdown at Libby.** The Corps will initiate variable December 31 flood control draft of Lake Koocanusa to take advantage of flexibility in low-runoff years to draft less, for better likelihood of refill and thus, provision of fish flows.
- **Determining possible spill at Libby dam.** Spilling water at Libby may be considered for 2004 based on results of a 2002 spill test evaluation and on interim NEPA analysis. The BiOp specifies that Libby be prepared to provide an additional 5,000 cfs flow above powerhouse capacity by 2004. Discharge of the additional flow increment is possible in 2004 only via the unmodified Libby spillway and could help provide KWS spawning and recruitment flows, but they also create gas supersaturation in the Kootenai River that exceeds state water quality standards. Whether an approval of up to 5,000 cfs voluntary spill is warranted, where to measure gas levels in the river below the dam, and monitoring necessary to evaluate the beneficial and adverse effects of spillway use, will be determined by coordination among the Corps, the state of Montana, the USFWS and BPA. A decision whether to conduct voluntary spill to aid KWS spawning and recruitment is expected by spring 2004.
- **Evaluating total dissolved gas management strategies.** Study of alternatives to using the unmodified spillway to pass water at Libby is ongoing. Possible alternatives range from an additional one or two turbines at Libby Dam to modification of the existing spillway and stilling basin. The study will produce an initial appraisal report of all possible alternatives that would allow KWS spawning and recruitment flows above current powerhouse capacity while minimizing total dissolved gas levels in the river downstream of the dam. The initial appraisal report builds on past evaluations of the feasibility of additional turbines or spillway deflectors.
- **Sturgeon Habitat Modification.** At this time, there is concern that survival of sturgeon eggs and progeny to age one is being compromised by the fact that sturgeon are spawning over sandy substrate. The eggs may be

getting coated with sand or buried. USGS studies of sediment transport and channel depth are underway; for FY04 they will be used to help determine possible engineering solutions that might provide clean (gravel-size or larger) spawning substrate. The community in Boundary County, Idaho, has a special interest in the outcome because of their concern over groundwater seepage and flood risk from sturgeon flow operations. It is therefore desirable to affect a solution that does not increase these risks, and if possible, reduces them.

As these alternatives are evaluated, primarily under Corps leadership, other viable alternatives may come to light. Results of the evaluations will determine how and how quickly this outcome will be achieved.

For the second outcome, the Action Agencies will continue research projects in 2004 focusing on the ecosystem of the Kootenai River where KWS spawn and rear, including nutrient and substrate studies. For additional details, see Appendix A.

### *2005–2008 Work Plan*

- **Libby VarQ.** The Corps will complete an EIS in 2005 that will evaluate impacts of managing elevations of Lake Koocanusa to increase the probability of achieving reservoir refill while providing recommended water volumes for KWS spawning and recruitment. System-wide effects on water management, including Canadian interests in their reservoirs, are of significant concern.
- **Libby Spill.** The 2002 spill test determined relationships between spill and dissolved gas at Libby Dam. Montana dissolved gas standards would appear to limit the amount of spill that can be voluntarily released at Libby Dam, but discussions between the Corps, the state of Montana, the USFWS, and BPA are underway to determine whether the state can approve some level of spill that may result in short-term exceedances of state water quality standards. Results from monitoring any spill in 2004, combined with the findings of the initial appraisal report on possible dissolved gas management strategies, will focus efforts on developing Libby Dam release strategies and possible physical modifications after 2004.
- **Sturgeon Habitat Modifications.** In 2005–2008, it is intended that a channel modification design, supported by non-federal cost sharing, may be implemented using the Corps' existing habitat restoration authorities.
- **Adult Sturgeon Transport.** In 2003, Idaho Fish and Game, as part of BPA-funded monitoring, transported some spawners upriver to Hemlock Bar in the Kootenai River canyon. There they documented at least one spawning event over clean gravel substrate. Eggs were to be checked for fertilization and viability, and larval monitoring was to occur. This stratagem is believed by the recovery team to be worth continuing, and will likely be repeated in 2004 and beyond in some form.
- **KWS Studies.** As factors that limit recruitment of naturally spawned KWS progeny to age one are identified, the objectives of these studies may have to be modified through the Council's Fish and Wildlife Program to respond to findings and to test new hypotheses.

## Resident Fish Substrategy 1.2: Kootenai River white sturgeon conservation hatchery program

### *Five-Year (2004–2008) Outcomes*

Until the KWS population is able to sustain itself through natural production, we will continue producing families of juveniles in a conservation hatchery program and releasing them to rear naturally and ultimately recruit (in 15–25 years) into the spawning population. In the next five years, this program will be continuously monitored, improved, and guided by policies developed by and through the KWS Recovery Team. The naturally spawning population of KWS may decline during this period because of senescence (*i.e.,* the individuals are aging beyond their reproductive years) and lack of significant recruitment to age one and into mature age classes. This anticipated trend would reduce the number of brood fish available for artificial production and may cause production goals to change.

### *2004 Work Plan*

The hatchery program will be continued. Priorities and deliverables in 2004 are similar to those of 2003.

#### Monitor and evaluate survival

- Monitoring the survival of previously released year-classes and reporting results to the KWS Technical Recovery Team (TRT) and in published progress reports. It will also be important to evaluate how newly discovered errors (underestimates) in KWS age estimation could affect production goals and recovery strategies.

#### Experimental releases

- Possible experimental releases of larvae or juveniles according to requests by USFWS and adaptive management consideration of KWS TRT.

### *2005–2008 Work Plan*

The Action Agencies will continue to assess the need for this program and to adapt the program to meet objectives of the KWS TRT. The Agencies will determine if year classes are successful by monitoring every year.

## Resident Fish Strategy 2: Determine the Impacts of the FCRPS on Bull Trout and Mitigate for Those Impacts

Although initially we will emphasize the substrategy for monitoring bull trout use of FCRPS areas, we expect that during the next five years there will be considerable evaluation of these monitoring results and potentially—where warranted—an increasing emphasis on the protection substrategy. Along the way we expect a recovery plan, interim monitoring results, and performance standards to begin guiding our efforts.

Regional coordination will occur through bull trout recovery planning, subbasin planning, and implementation of the Council's Fish and Wildlife Program, and ad hoc project- and issue-specific processes and forums. Cooperation will be provided, for example, in developing studies relating to bull trout in tributaries of the Bonneville pool and in developing performance standards appropriate for bull trout.

### Resident Fish Substrategy 2.1: Determine the extent to which bull trout use and are affected by FCRPS dams and reservoirs

#### *Five-Year (2004–2008) Outcomes*

During the next five years, the Action Agencies expect to:

- Complete initial studies and make recommendations regarding bull trout passage at Albeni Falls Dam.
- Better quantify how elevations of Lake Pend Oreille affect the abundance of kokanee prey available to bull trout in the lake.
- Make a decision whether to proceed with fish passage at Albeni Falls Dam.
- Obtain estimates of the extent to which bull trout use reaches of the mainstem Columbia and Snake rivers affected by the FCRPS.
- Produce estimates of bull trout use of Dworshak Reservoir.
- Evaluate, along with the USFWS, the significance of these findings and develop appropriate FCRPS responses.

#### *2004 Work Plan*

<u>Continue projects and monitor bull trout use of the mainstem</u>

In the next year, the Action Agencies will continue projects begun in 2003, with an increasing emphasis on monitoring bull trout use of the mainstem Columbia and Snake rivers. Specific activities include:

- Monitor passage at mainstem projects.
- Evaluation of bull trout movement and habitat use at Dworshak and seasonal distribution and abundance.
- Annual progress reports.
- Continue Lake Pend Oreille studies.
- Provide results of Pend Oreille bull trout movement study to USFWS.
- Trapping and monitoring operations conducted for anadromous salmonids that might also detect bull trout movement into or out of the mainstem FCRPS areas.
- Radio tagging and telemetry of Tucannon bull trout to monitor their use of the mainstem Snake River.
- Monitoring bull trout in reaches downstream of Libby and Hungry Horse dams.

#### *2005–2008 Work Plan*

- Continue to include bull trout numbers in mainstem counting facilities.
- Continue studies to identify/quantify adfluvial populations that use the mainstem Columbia and Snake rivers.
- Continue bull trout studies at Dworshak and in the mainstem.
- Continue with initial studies of passage at Albeni Falls Dam.
- Continue studies of predator-prey dynamics in Lake Pend Oreille.
- With USFWS, develop a plan for winter lake elevations at Albeni Falls through FY 2010.
- Work with USFWS to reach a decision on fish passage at Albeni Falls Dam.
- If determined to be necessary, seek appropriations for construction of fish passage facility at Albeni Falls Dam.
- Implement appropriate management actions (substrategy 2.2, below) based on the results of these and subsequent studies.

Our plan is to continually evaluate both the quality and implications of the results of the studies. Some studies/projects may be augmented; others may be dropped as ineffective.

### Resident Fish Substrategy 2.2: Operate and modify FCRPS dams to protect, provide and reconnect bull trout habitats

#### *Five-Year (2004–2008) Outcomes*

Where there already is a relatively clear link between the FCRPS and the welfare of bull trout—particularly at Hungry Horse, Libby, and Albeni Falls dams—we will continue to implement protective measures.

#### *2004 Work Plan*

- Manage winter elevations in Lake Pend Oreille (regulated by Albeni Falls Dam) on an experimental basis to help Idaho Fish and Game determine its effect on kokanee reproduction. This is intended to promote a healthier forage base of kokanee for bull trout in the lake, which also should help protect juvenile bull trout from being targeted by other predators.
- Manage flows from Hungry Horse and Libby dams to minimize downstream effects on bull trout.
- Continue to track and determine use of adult bull trout in the mainstem Columbia and Snake rivers.
- Evaluate effects of Dworshak operations on bull trout.

#### *2005–2008 Work Plan*

- Continue managing flows through/over Libby and Hungry Horse dams to protect bull trout in downstream reaches.
- Continue to regulate the winter elevation of Lake Pend Oreille to promote production of kokanee prey.
- Explore and develop other methods to promote feeding and competitive environment favorable to bull trout in Lake Pend Oreille.
- Continue studies that monitor bull trout use of the mainstem Columbia and Snake rivers.
- Determine whether modification of the FCRPS is needed.

### Resident Fish Substrategy 2.3: Develop performance standards for bull trout

#### *Five-Year (2004–2008) Outcomes*

By 2007, performance standards appropriate for FCRPS operations and bull trout will be developed and monitoring programs in place to track status and performance.

#### *2004 Work Plan*

Bull trout recovery plan

- In cooperation with the USFWS, the Action Agencies will review the bull trout recovery plan and determine ways to measure the affects of FCRPS operations on bull trout and to gauge how well the FCRPS is mitigating those impacts.
- The USFWS will lead in developing performance standards, and the recovery plan, when released, is expected to provide the foundation for those standards. FY04 may be the first year to begin work under the standards, and the Action Agencies will cooperate in developing those for the FCRPS.

#### *2005–2008 Work Plan*

At this time we cannot predict how the standards will be applied.


## 5.6 RM&E Priorities

NOAA Fisheries and the Action Agencies are working together to develop and implement a comprehensive RM&E plan as called for under the NOAA Fisheries BiOp and the All-H Strategy. The September 11, 2003 version of the RM&E Plan for the NOAA Fisheries BiOp is posted at http://www.efw.bpa.gov/cgi-bin/FW/Welcome.cgi. The RM&E Plan is currently being reviewed by an independent scientific review board and regional state, federal and tribal monitoring groups. The RM&E plan and associated projects are intended to provide information needed to assess the status of ESA-listed anadromous fish populations at the 2005 and 2008 BiOp check-in evaluations, and to identify and prioritize the most effective actions towards stock performance. This work will include the identification of appropriate funding levels and coordination relative to the RM&E work and the responsibilities of other regional, state and federal entities. Completion of a final plan and successful implementation of that plan will require the active participation and cooperation of state and tribal entities, as well as other federal agencies. While much work needs to be done in this area, significant progress towards achieving this coordination has been accomplished to date. A Pacific Northwest Aquatic Monitoring Partnership (PNAMP) is actively engaging this regional coordination and the Action Agencies will be working in this group to further develop a regional monitoring coordination plan that includes integration of the BiOp RM&E Plan.

The continued development, coordination, and implementation of the RM&E plan that addresses the needs of status monitoring, action effectiveness research, and critical uncertainties is a top priority for the years 2004 through 2008. The oversight RM&E Planning Group and several technical working groups will continue accomplishment of this work.

The RM&E Plan projects are continuing steps in a multi-year effort towards plan development and implementation. Specific RM&E projects will continue to be identified and prioritized through the Corps' AFEP forum, Reclamation's priority subbasin program, and the Council's Fish and Wildlife Program.

In addition to the continued development and implementation of a comprehensive RM&E plan, top priorities for 2004–2008 include:

- Projects that meet the objectives of a structured population status monitoring program.
- Action effectiveness research projects (including ongoing and new pilot studies).
- Research studies addressing critical uncertainties in ESU population assessments.
- An action implementation tracking system.
- An analytical assessment data-support system.
- A regional coordination process for collaboratively working with other regional federal, state and tribal RM&E programs.

The RM&E plan six principal components and the associated sub-components that must be addressed to meet the requirements of the BiOp. These principle components coincide with the following RM&E strategies that will continue to be implemented in 2004–2008: (1) Status Monitoring, (2) Action Effectiveness Research, (3) Critical Uncertainties Research, (4) Project Implementation Monitoring, (5) Data Management and (6) Regional Coordination. To properly organize, design and implement the plan's components, some of the strategies are further delineated by substrategies. Status Monitoring substrategies are outlined according to geographic zones at which the monitoring occurs, such as, tributary habitat, hydropower corridor, estuary/ocean habitat, and the comprehensive, system level. For the Action Effectiveness and Critical Uncertainty strategies, the substrategies are grouped according to whether they apply to management areas of hatcheries, habitat, harvest, or the hydrosystem. For more project specific details, see Appendix A.

## RM&E Strategy 1: Status Monitoring

Under this strategy, the Action Agencies will assist NOAA Fisheries, the Council, and other federal, state, and tribal efforts to track the status of fish populations and their environment relative to required performance standards. Projects under this strategy are associated with NOAA Fisheries BiOp actions that provide or support status information such as adult and juvenile fish abundance, distribution, and survival, or environmental conditions that have been identified as key measures of fish performance. This work requires identification of appropriate funding levels and coordination relative to the responsibilities of other regional state and federal entities. More detailed information on the structure and planned approach to meeting the status monitoring requirements of the FCRPS BiOp is provided in the current version of the Research, Monitoring & Evaluation Plan for the NOAA Fisheries 2000 Federal Columbia River Power System Biological Opinion at http://www.efw.bpa.gov/cgi-bin/efw/E/Welcome.cgi.

### *Five-Year (2004–2008) Outcomes*

The following outcomes have been targeted for the next five years:

- A Status Monitoring Program. The NOAA Fisheries FCRPS BiOp calls for a comprehensive monitoring program. This program is not fully specified in the BiOp and so requires further development prior to implementation. The BiOp proposes a cooperative framework for a monitoring program that involves NOAA Fisheries, the Action Agencies, and other federal and state entities with experience in developing large-scale comprehensive monitoring programs.
- An estuary/ocean Monitoring Program that is an integrated part of the Status Monitoring Program.
- A regionally coordinated program for aerial and satellite imagery data.
- Biological information necessary to conduct population level, hydrosystem, and offsite mitigation performance tests identified in the BiOp.
- TRT recovery planning products.
- Development of performance standards or bench marks and monitoring relative to these standards to evaluate the status of the environment and fish populations necessary to help prioritize future mitigation actions.

### RM&E Status Monitoring Substrategy 1.1: System Monitoring

This substrategy includes status monitoring actions that are focused at the entire system or are process oriented.

#### *2004 Work Plan*

A general listing of system level status monitoring projects to occur in 2004 is provided below. Individual project summaries are listed in more detail in Appendix A.

- **Develop a status monitoring program.** Finalize development of a status monitoring program and associated status monitoring project guidelines through

the Action Agency/NOAA Fisheries RM&E workgroup, the Wenatchee, John Day and Upper Snake River Pilot projects, the Pacific Northwest Aquatic Monitoring Partnership, and the CBFWA Collaborative Monitoring Project, and scientific reviews by the ISAB and ISRP.

- Conduct **long-term monitoring and evaluation** of stream, watershed, and aquatic conditions.
- **Landscape analysis.** Implement a landscape change analysis using LANDSAT satellite imagery and compare IKONOS high resolution imagery with LANDSAT imagery for landscape analysis. Also, produce digital maps of the riparian areas, wetland features, and stream channel boundaries for mainstem streams. Assess the feasibility of remote monitoring approaches to quantify adult steelhead in select tributaries.
- **Implement pilot studies** for reduced scope versions of the program and test specifically challenging aspects of its design, coordination, and implementation.
- Implement and maintain Columbia River Basin PIT-Tag Information System.
- **Produce TRT recovery planning products** for Columbia Basin ESUs (NOAA Fisheries cost share).

### *2005–2008 Work Plan*

The Action Agencies will work with other regional entities and provide technical assistance and cost sharing with NOAA Fisheries for the following:

- TRT recovery planning for Columbia Basin ESUs.
- Implementation of a regionally coordinated RM&E plan (including coordinated regional agreement on data collection protocols).
- Implementation of a regionally coordinated program for aerial and satellite imagery data.
- Continued development and implementation of new fish detection and tagging techniques. Newly funded projects are also developing resource management plans with associated NEPA environmental analysis over the course of five years.

## RM&E Status Monitoring Substrategy 1.2: Tributary Monitoring

This substrategy includes status-monitoring actions within tributary habitats. More detailed information on the structure and planned approach to meeting the tributary status monitoring requirements of the NOAA Fisheries BiOp is provided in the Tributary Population and Environmental Status and Restoration Action Effectiveness Monitoring section of the Research, Monitoring & Evaluation Plan for the NOAA Fisheries 2000 Federal Columbia River Power System Biological Opinion at http://www.efw.bpa.gov/cgi-bin/efw/E/Welcome.cgi.

### *2004 Work Plan*

A general listing of tributary level status monitoring projects to occur in 2004 is provided below. Individual project summaries are listed in more detail in Appendix A.

- Implement **pilot study approaches** to status monitoring in the Wenatchee, John Day, and Upper Salmon subbasins.
- Identify and document current **status monitoring** efforts in the region relative to the requirements identified in the NOAA Fisheries/Action Agency RM&E Plan and work with the region to develop additional projects needed to fill gaps.
- Participate in and provide resources to **support** the Pacific Northwest Aquatic Monitoring Partnership.
- Work with the USFWS to further **define status monitoring requirements** for resident fish and integrate these monitoring requirements with the NOAA Fisheries/Action Agency RM&E Plan.
- **Finalize the Upper Columbia Basin Monitoring Plan** as part of the ongoing work through the Wenatchee pilot project. Implement status monitoring components of this plan in coordination with other regional entities.
- Develop status monitoring **sampling designs and reporting protocols** in the John Day Basin. Monitor John Day Basin adult steelhead spawning and juvenile migration timing, abundance, and rearing densities.
- **Monitor** emergence, growth, migration timing, and survival of Snake River fall Chinook.
- **Obtain accurate counts** of fall Chinook salmon redds upriver of Lower Granite Dam.
- **Prioritize status monitoring** work in the Columbia River Basin.
- **Monitor native species** abundance.

### *2005–2008 Work Plan*

The Action Agencies will continue to work with NOAA Fisheries, USFWS, and other regional entities on the ongoing projects from 2004 and the development of additional monitoring projects. Further development of the Status Monitoring component of the NOAA Fisheries and Action Agency RM&E program and integration of resident fish monitoring needs will guide the further development and implementation of additional projects at a programmatic level.

## RM&E Status Monitoring Substrategy 1.3: Hydrosystem Corridor Monitoring

This substrategy includes status monitoring actions that are focused on the hydrosystem corridor. More detailed information on the structure and planned approach to meeting the hydro corridor status monitoring requirements of the NOAA Fisheries BiOp is provided in the Hydrosystem section of the Research, Monitoring & Evaluation Plan for the *NOAA Fisheries 2000 Federal Columbia River Power System Biological Opinion* at http://www.efw.bpa.gov/cgi-bin/efw/E/Welcome.cgi.

### *2004 Work Plan*

A general listing of hydrosystem corridor level status monitoring projects to occur in 2004 is provided below. Additional projects are currently under development and approval processes through the Council's Provincial Review. Individual project summaries are listed in more detail in Appendix A.

- Conduct annual Smolt Monitoring Program (SMP) at seven mainstem Snake and Columbia River dams.
- Monitor wild Snake River spring/summer Chinook salmon smolt migrations.
- Monitor smolt condition relative to biological and environmental conditions.
- Monitor adult returns with the PIT-tag detection system.

Configuration RM&E plans for 2004 are listed below. Individual work plans for RM&E projects are developed through AFEP and in coordination with the System Configuration Team (SCT). More detailed plan descriptions are included in Appendix A.

#### Bonneville Dam

- Estimate total project and route-specific juvenile survival and fish passage efficiency for the new Bonneville 2nd powerhouse corner collector and juvenile bypass system, spillway, 1st powerhouse sluiceway and new minimum gap runners for spring and summer species; 1st powerhouse sluiceway efficiency.

#### The Dalles Dam

- Characterize stilling basin hydraulic conditions, estimate direct plus indirect survival and injury rates, and estimate juvenile fish travel paths through the stilling basin. Evaluate fish passage efficiency for all routes of juvenile passage.

#### John Day Dam

- Estimate project and route specific survival rates, fish passage efficiency and spill passage efficiency, forebay retention time, and tailrace egress for juvenile passing through John Day Project.

#### McNary Dam

- Estimate project and route specific juvenile survival rates.

#### Ice Harbor

- Estimate project and route specific juvenile survival rates.
- Determine cause of spillway injury and mortality for juvenile fish.

#### Lower Monumental

- Estimate project and route-specific juvenile survival rates.

#### Lower Granite

- Estimate passage efficiency and survival of subyearling Chinook with removable spillway weir.

#### Hydrosystem

- Continue adult passage telemetry to assess unaccounted loss and delay of radio tagged fish to develop a strategy for integrating information from adult pit tag monitoring to the baseline studies for adult survival.
- Report on water temperature effects on adult salmonids between McNary and confluence of Clearwater.
- Evaluation of fish ladder temperature evaluations.
- Multiple bypass study completion (comparative survival, differential recovery, physiological differences, bypass vs. undetected, guided vs. unguided, and pathogens).

### *2005–2008 Work Plan*

The Action Agencies will provide adult and juvenile migration monitoring at dams and improve adult PIT-tag detectors at Bonneville, McNary, Ice Harbor and Lower Granite dams. Many of the above studies will continue throughout 2005–2008. It is anticipated that information and configuration or operational changes needed to improve passage survival rates will be revealed and in most cases implemented. It is expected that PIT-tag detection systems for both juveniles and adults will have been developed and installed in the 2003–2005 time period to enable passage survival rates to be quantitatively calculated for the NOAA Fisheries BiOp 2008 check-in evaluation. Adult return data during 2005–2008 should be sufficient to verify/establish the delayed system mortality rate.

## RM&E Status Monitoring Substrategy 1.4: Estuary/Ocean Monitoring

Within the ocean/estuary environment NOAA Fisheries lists six RM&E Actions in the BiOp. Five of the six Actions are associated specifically with status monitoring. In particular,

two call for research on fundamental salmon biology and ecology in the estuary and one specifically calls for the establishment and implementation of a RM&E estuary/ ocean program. Determining salmon usage of the estuary and freshwater plume and linkages between estuarine conditions and salmon population structure and resilience through modeling is also specified. At present various organizations are conducting studies within the estuary/ocean environment. Many water quality monitoring efforts by various local, state, and federal agencies are being conducted in the estuary. In addition, the US Geological Survey is conducting sediment core analysis for the estuary. The LCREP has begun a comprehensive plan for the ocean / estuary environment with respect to restoring habitat and fish populations. Where possible, the RM&E Estuary/Ocean workgroup will continue to coordinate work efforts and estuary/ocean RM&E planning with groups conducting research, monitoring, and evaluation of the estuary/ocean environment.

Due to the paucity of current data in this area, baseline conditions will be needed to provide guidance for developing habitat improvement projects and context to evaluate the results of habitat improvement activities. Furthermore, the basic ecology of salmon in the lower Columbia River and estuary is poorly known. There are no current or proposed projects that investigate the adult salmon use of the estuary although some of the tracking technologies being developed may help. A current proposed "action plan" to research and gather information in this area is presently under development.

More detailed information on the structure and planned approach to meeting the estuary/ocean requirements of the FCRPS BiOp is provided in the RM&E Plan for the Columbia River Estuary and Plume which is a September 30, 2003, supplement to the September 11, 2003, Research, Monitoring & Evaluation Plan for the NOAA Fisheries 2000 Federal Columbia River Power System Biological Opinion, both located at http://www.efw.bpa.gov/cgi-bin/efw/E/Welcome.cgi.

### *2004 Work Plan*

A general listing of estuary/ocean level status monitoring projects to occur in 2004 is provided below. Additional projects are currently under development and approval processes through the Council's Provincial Review. Individual project summaries are listed in more detail in Appendix A.

- Conduct mesoscale, predator and forage, and salmon growth surveys.
- Inventory ocean/estuary habitat.
- Develop physical habitat metrics.
- Conduct coupled and physical-biological modeling of the estuary environment.
- Develop a model to highlight relationship among hydropower, water management, estuarine conditions, and fish response.
- Define and analyze management scenarios and limiting factors to determine which ecosystem functions and habitats are most critical to salmon production in the estuary.
- Conduct research to describe spatial and temporal environmental features of the Columbia River Plume and influences of the hydrosystem flows. Develop and calibrate plume circulation model.
- Develop a study plan that identifies necessary research, establish the scope and determine funding needs.
- Partial funding of avian predation study.
- Continue PIT-tag recovery on bird colonies.
- Continue study with increased emphasis on inland colonies and development of management alternatives to reduce avian predation in these locales.
- Evaluate salmonid use of the Columbia River estuary, plume and nearshore ocean environments.

### *2005–2008 Work Plan*

The Action Agencies will continue to evaluate the relationships between estuary, plume, and nearshore ocean conditions and juvenile salmon growth and survival. Activities addressing NOAA Fisheries RPA Actions 196 and 197 were started in 1998 and continue under contract between BPA and the NOAA Fisheries Science Center. The Corps has also closely coordinated estuary research funding with NOAA Fisheries since 2001. Adult research needs are being addressed through development of acoustic and PIT-tag studies and will be further developed in the planning process.

NOAA Fisheries RPA Action 197 calls for "evaluating juvenile and adult use of the estuarine and nearshore environments," and will require monitoring techniques still in the early phases of development. In particular, the use of acoustic (sonic) tags with fixed, towed, or buoyed detector arrays is recommended, as is continued development of existing technologies such as PIT-tag detector flow through trawl surveys. Development of these methods continues to be funded by BPA, the Corps and NOAA Fisheries. In addition, BPA has provided funding to the Department of Fisheries and Oceans Canada, in coordination with NOAA Fisheries, for joint U.S.–Canada nearshore fish and oceanographic monitoring in Canadian waters. Finally, continued scrutiny of project goals and objectives will occur to eliminate potential project overlaps in order to effectively leverage available monies from all available funding sources.

## RM&E Strategy 2: Action Effectiveness Monitoring and Research

The objective of this strategy is to define effects of mitigation actions on fish survival, fish condition, and habitat condition in a quantitatively rigorous approach. This information will be critical to the projections of the expected benefits of hydrosystem and offsite mitigation actions in the 2005 and 2008 check-in evaluations. This research requires well-designed experiments, with treatment areas, controls and adequate replication. Casual monitoring will not meet the objectives of this strategy.

Research conducted under this strategy may require time beyond the NOAA Fisheries BiOp planning horizons to manifest fish survival effects. Therefore the Action Agencies will initiate other studies to establish cause-and-effect relationships between tributary actions and physical/environmental effects. These relationships will be used as performance measures until survival estimates are obtained from the experiments.

The Status Monitoring/Tributary Habitat Action Effectiveness Research Work Group will continue to refine an effectiveness research plan that addresses abundance and survival data for both adult and juvenile salmonids, as well as habitat indicators. The habitat effectiveness studies will be integrated with status monitoring, other types of action effectiveness research, and critical uncertainties research as part of the broader comprehensive RM&E Program called for in the BiOp, the All-H Strategy, and the Columbia River Basin Fish and Wildlife Program, and outlined in the Action Agencies Implementation Plans. The approaches to habitat effectiveness research are being reviewed by the ISAB in early FY 2004. More detailed information on the structure and planned approach to meeting the action effectiveness research requirements of the FCRPS BiOp is provided in the Research, Monitoring & Evaluation Plan for the NOAA Fisheries 2000 Federal Columbia River Power System Biological Opinion at http://www.efw.bpa.gov/cgi-bin/efw/E/Welcome.cgi.

### *Five-Year (2004–2008) Outcomes*

Key outcomes targeted for this strategy are:

- Effectiveness research studies that adequately cover offsite habitat mitigation categories of actions and ESUs identified in RPA 183 and are necessary to perform 2005 and 2008 check-in evaluations.
- Effectiveness research for estuary/ocean habitat mitigation actions.
- Effectiveness research to evaluate the effect of hydrosystem mitigation actions on categories of ESUs.
- Effectiveness research to determine the effects of changes in hatchery or harvest management practices on ESUs.
- Effectiveness research to determine juvenile survival and partition losses below Bonneville Dam through the estuary.
- Evaluations of the relationships among time of ocean entry, physical and biological characteristics of the estuary and plume environments and adult return rates.
- Metrics further developed to assess cumulative response to restoration projects in the estuary.

## RM&E Substrategy 2.1: Action Effectiveness Research: Hydrosystem

This substrategy focuses on hydrosystem related action effectiveness research. More detailed information on the structure and planned approach to meeting the hydrosystem action effectiveness research requirements of the NOAA Fisheries BiOp is provided in the Hydrosystem section of the Research, Monitoring & Evaluation Plan for the *NOAA Fisheries 2000 Federal Columbia River Power System Biological Opinion* at http://www.efw.bpa.gov/cgi-bin/efw/E/Welcome.cgi.

### *2004 Work Plan*

A general listing of hydrosystem action effectiveness research projects to occur in 2004 is provided below. Individual project work plans are listed in more detail in Appendix A.

- Provide information to fishery managers to maximize the effectiveness of summer flow augmentation.
- Provide in-season statistical support, real-time running predictions, and annual review of run-timing predictions.
- Perform statistical analysis of historical tagging data.
- Provide analysis of smolt-to-adult ratios.
- Conduct statistical evaluation of performance standards to improve decision analysis for assessing RPA compliance.
- Study how summer flow augmentation affects water temperature, water velocity, and juvenile fall Chinook salmon migratory behavior and survival in Lower Granite Reservoir.
- Determine juvenile fish-transportation effectiveness through evaluation of: (1) survival and adult return rates of juvenile salmon transported compared to in-river migrating fish; (2) post-release losses and barging strategies that minimize post-release mortality; (3) benefits of trucking juvenile salmon; and (4) late-season transportation at McNary Dam.

Bonneville Dam

- Evaluate improvements to the screen bypass system and determine level of implementation if appropriate.
- Continue evaluation of new passage system for adult lamprey.
- Complete analysis of adult fallback through Bonneville Dam and make recommendations on potential improvements.

The Dalles Dam

- Evaluate behavior of fish in the forebay of The Dalles Dam. The intent of this study is to evaluate the feasibility of a physical guidance device for the forebay; it will assist in design of the device to improve fish passage efficiency.
- Evaluate adult delay and fallback with new spill patterns developed with respect to the installation of the spillway training wall.
- Evaluate the prominence of smallmouth bass in the tailrace of The Dalles and develop means to reduce the potential for predation on juvenile salmonids.

John Day Dam

- Evaluate the potential to improve fish guidance efficiency at John Day Dam. Assess injury and survival with new vertical barrier screens installed.
- Final year of evaluation of new exit control section to reduce delay through the south ladder.

McNary Dam

- Prepare plans and specifications for prototype removal/ relocation, preparation of final report, and plan for feasibility recommendations, as warranted.
- Evaluate effectiveness of spring/summer Chinook, fall Chinook and steelhead juvenile fish transportation.

Ice Harbor Dam

- Evaluate high velocity flume fish separator with high fish densities.

Little Goose Dam

- Complete high flow sampling of the effectiveness of the trash boom.

Lower Granite Dam

- Surface bypass and collection. Evaluate removable spillway weirs (RSW) with behavioral guidance structure installed.
- Fish ladder transition pool evaluation. Complete final report and make decision on whether to construct permanent RSWs.

Hydrosystem

- Turbine passage survival study. Initiate phase 2 of the TSP program to develop a strategy for rehabilitation of existing turbine units, develop turbine operating guidelines to improve fish survival and conduct studies to support Ice Harbor turbine replacement. Conduct second year of minimum gap runner testing to determine best operation for fish survival..
- Evaluate the effects of changes in fish ladder temperature
- Complete study on the effects of sea lions on adult salmonids immediately below Bonneville Dam.
- Evaluate passage, returns, and long-term survival of steelhead in the lower Columbia River.
- Complete study on adult headburn and make recommendations on potential solution if appropriate.
- Evaluate the potential improvements to juvenile PIT-tag detections associated with high volume flumes (*e.g.,* Bonneville corner collector).
- Evaluate the behavior of juvenile fish with different entrance designs (*e.g.,* The Dalles sluiceway, Bonneville corner collector, Lower Granite RSW).

### *2005–2008 Work Plan*

Continue work on statistical evaluation of performance standards to improve decision analysis for assessing NOAA Fisheries BiOp compliance. Continue work on understanding how summer flow augmentations affects water temperature, water velocity, juvenile fall Chinook salmon migratory behavior, and juvenile fall Chinook survival in Lower Granite Reservoir. Continue ongoing AFEP research projects identified under the 2004 work plan.

## RM&E Substrategy 2.2 Action Effectiveness Research: Tributary Habitat

This substrategy focuses on tributary habitat related action effectiveness research. More detailed information on the structure and planned approach to meeting the tributary habitat action effectiveness research requirements of the FCRPS BiOp is provided in the Tributary Population and Environmental Status and Restoration Action Effectiveness Monitoring section of the Research, Monitoring & Evaluation Plan for the NOAA Fisheries 2000 Federal Columbia River Power System Biological Opinion at http://www.efw.bpa.gov/cgi-bin/efw/E/Welcome.cgi.

### *2004 Work Plan*

A general listing of habitat action effectiveness research actions to occur in 2004 is provided below. Further projects needed to meet RPA Action 183 are planned to be developed

and implemented in 2004 contingent on ISAB review of proposed approaches to this research. Individual project summaries for current projects are listed in more detail in Appendix A.

- Implement pilot study approaches to action effectiveness research in the Wenatchee, John Day, and Upper Salmon subbasins.
- Identify and document current action effectiveness research efforts in the region relative to the requirements identified in the NOAA Fisheries/Action Agency RM&E Plan and work with the region to develop additional projects needed to fill gaps.
- Continue implementation and reporting of nutrient enhancement studies.
- Continue implementation of a pilot study on the effects of diversion dam removal as a part of the John Day pilot study.
- Develop a monitoring plan for the Methow subbasin.
- Implement a study of the effects of replacing diversion dams in the Methow subbasin.
- Develop (jointly with NOAA Fisheries and the Council) and initiate other Tier 3 effectiveness studies as part of the John Day pilot study. These studies will address the effects of water augmentation, flood irrigation removal, and diversion screen installations.
- Work with other agencies and parties to prioritize effectiveness monitoring activities in the Columbia River Basin.
- Implement channel restoration and monitor response of fish community to change in habitat condition.
- Evaluate effectiveness of restoration projects for producing long-term watershed improvements; use data and trends developed to provide guidance for subbasin planning and future land management decisions.

### *2005–2008 Work Plan*

Continue to develop and implement habitat effectiveness research projects and modify existing projects based on pilot study results.

## RM&E Substrategy 2.3 Action Effectiveness Research: Hatchery

This substrategy focuses on hatchery related action effectiveness research. More detailed information on the structure and planned approach to meeting the hatchery action effectiveness research requirements of the FCRPS BiOp is provided in the Hatchery and Harvest section of the Research, Monitoring & Evaluation Plan for the NOAA Fisheries 2000 Federal Columbia River Power System Biological Opinion at http://www.efw.bpa.gov/cgi-bin/efw/E/Welcome.cgi.

### *2004 Work Plan*

A general listing of hatchery action effectiveness research to occur in 2004 is provided below. Individual project work plans are listed in more detail in Appendix A.

- Evaluate acclimated spring Chinook salmon performance.
- Evaluate life history differences between hatchery and wild origin.
- Evaluate environmental factors affecting survival and migration.
- Evaluate weir effects on fish migration and/or behavior.
- Estimate survival of hatchery-tagged groups.

### *2005–2008 Work Plan*

- Develop preliminary catch, escapement and distribution data for all Columbia River hatcheries to evaluate effectiveness of management actions.
- Determine if program targets for contribution rate of hatchery fish are being achieved.
- Estimate ecological and genetic impacts of hatchery fish on wild populations.
- Determine how harvest opportunities of hatchery fish can be optimized.
- Determine if relationship exists between in river conditions (flow and temperature) and emigration success, residualism rate, and persistence of residual steelhead.

## RM&E Substrategy 2.4: Action Effectiveness Research: Harvest

This substrategy focuses on harvest related action effectiveness research. More detailed information on the structure and planned approach to meeting the harvest action effectiveness research requirements of the FCRPS BiOp is provided in the Hatchery and Harvest section of the Research, Monitoring & Evaluation Plan for the NOAA Fisheries 2000 Federal Columbia River Power System Biological Opinion at http://www.efw.bpa.gov/cgi-bin/efw/E/Welcome.cgi.

### *2004 Work Plan*

- Develop and implement a biologically sound harvest monitoring program.
- Determine the effectiveness of harvest strategies that are consistent with treaty reserved fishing rights.

### *2005–2008 Work Plan*

Develop, implement, and maintain continued research on the effectiveness of harvest strategies that are consistent

with treaty reserved fishing rights. Develop and implement research on non-retention mortalities.

## RM&E Strategy 3: Critical Uncertainties Research

This strategy resolves critical uncertainties and issues related to the assessment methods and data required to evaluate future population performance and needed survival improvements. Projects under this strategy are associated with BiOp actions that address large, systematic research needs and improvements in analytical methods required for more robust and confident assessments of population extinction risks, probabilities of recovery, and needed survival improvements for each ESU. These are critical areas of uncertainty in survival conditions and needed survival improvements identified for fish populations of each ESU.

Critical uncertainties include: reproductive success of hatchery fish spawning in the wild; magnitude of delayed differential mortality of transported smolts (D); and the extent of extra mortality and its causes. Included under this RM&E category are research projects that may not have been designated as "critical" to BiOp assessments, but are called for under a number of BiOp actions. This substrategy focuses on tributary habitat related action effectiveness research. More detailed information on the structure and planned approach to meeting the critical uncertainties requirements of the FCRPS BiOp is provided in Research, Monitoring & Evaluation Plan for the NOAA Fisheries 2000 Federal Columbia River Power System Biological Opinion at http://www.efw.bpa.gov/cgi-bin/efw/E/Welcome.cgi.

### *Five-Year (2004–2008) Outcomes*

Further development of the critical uncertainties research components and projects for a comprehensive RM&E plan will include participating with NOAA Fisheries, the Council, and other regional entities to accomplish the following key outcomes:

- Identify key critical uncertainties that need research.
- Develop requests for proposals and qualifications for research projects.
- Develop and implement a schedule for peer review of research proposals.
- Complete initial five years of research targeting key critical uncertainties.
- Participate in a regional technical group to successfully resolve critical uncertainties in analytical methods used for assessments of population performance.

### *2004 Work Plan*

A general listing of critical uncertainty projects to occur in 2004 is provided below. Additional projects are currently under development and approval through the Council's Provincial Review. Individual project work plans are listed in more detail in Appendix A.

Projects in 2004 will address:

- Uncertainty of in-river juvenile migration survival.
- Relative survival difference of in-river versus transported fish.
- Effect of ocean entry timing.
- Delayed mortality related to hydrosystem passage.
- Uncertainty of different dam passage histories relative to health and delayed mortality.
- Extra mortality and its causes.
- Reproductive success of hatchery fish relative to wild fish.
- Effect of hydrosystem flow modifications on the estuary.
- Salmonid use of the estuary.
- Continue study to determine comparative post-system delayed mortality and isolate areas of loss, evaluate behavioral changes, and evaluate logistical and mechanical barging process.
- Evaluate the restoration potential of Snake River fall Chinook salmon spawning habitat.

### *2005–2008 Work Plan*

Critical research projects identified under the 2004 work plan will continue in the 2005–2008 period.

## RM&E Strategy 4: Project Implementation Monitoring

Compliance monitoring, or project implementation monitoring, is necessary to determine how well management actions are implemented and is explicitly called for under RPA Action 163. All projects should have explicit deliverables and should be evaluated to determine how well these deliverables were met. From a biological perspective, this monitoring will help to distinguish between actions that did not work and actions that were not implemented successfully. This tracking will also assist in the programmatic crediting of actions. In addition, it is essential for the biological performance assessments of offsite mitigation actions that must be modeled using effectiveness research in combination with an accounting of the number and location of different categories of actions.

### *Five-Year (2004–2008) Outcomes*

The following key outcomes are expected over the next five years:

- Develop and implement a database with capabilities to track projects under various queries.
- Develop and implement an internal compliance-auditing program that evaluates the success of achieving and maintaining project deliverables.

### *2004 Work Plan*

A general listing of project implementation projects to occur in 2004 is provided below.

- Develop and maintain an interim database system for project tracking and progress reporting.
- Develop a plan for compliance auditing.

### *2005–2008 Work Plan*

Continue the refinement and application of a project tracking system. Apply compliance auditing plan to completed projects.

## RM&E Strategy 5: Data Management System

The complex of information obtained through the BiOp related RM&E program will need to be compiled and organized in a systematic manner. At this time there is no adequate system in place. The region's information management system is an ad-hoc distributed information system that lacks essential components, and more importantly, coherent organization, standards, protocols, shared responsibility or structure. The objective of this strategy will be to establish an information system or further develop existing regional information systems to support the RM&E program and related performance assessments. It will involve compiling and archiving monitoring data, derived estimates and all technical reports treating these issues. Whatever system is adopted will need to ensure timely and easy access to the information.

The Council and NOAA Fisheries entered into a Memorandum of Agreement to proceed with a program for "Cooperative Regional Information System Development in the Columbia Basin." BPA will continue to participate in the planning group that has formed under this agreement, which is working to evaluate and implement the Scientific Applications International Corporation (SAIC) data needs assessment and recommendations on steps necessary to build a Northwest Data Network.

With the urgency to begin collecting RM&E data to satisfy the BiOp requirements, the federal RM&E Data Work Group is developing its data collection needs and protocols. The draft BiOp RM&E plan lists some key objectives for a region-wide data management system. Those objectives include: (1) meet monitoring and evaluation and scientific research needs; (2) ensure access to biological data; (3) include data pedigree and metadata and clearly distinguish primary data and derived information; (4) develop and use common protocols and techniques for data collection, development, storage and distribution; (5) promote integration and free exchange of data; (6) provide for real time input; (7) provide security; (8) design, develop, test, implement and operate a coordinated system; and (9) develop an ongoing coordination process.

The RM&E work group will coordinate and participate in the regional development of a data support system that meets the needs of the BiOp RM&E plan. Until this system is developed, a near term data support system will need to be developed and applied to meet these requirements.

More detailed information on the structure and planned approach to meeting the data management requirements of the FCRPS BiOp is provided in the Research, Monitoring & Evaluation Plan for the NOAA Fisheries 2000 Federal Columbia River Power System Biological Opinion at http://www.efw.bpa.gov/cgi-bin/efw/E/Welcome.cgi.

### *Five-Year (2004–2008) Outcomes*

- Develop and maintain an interim data management system to support immediate program needs.
- Work with the region to develop a regional data support system network that meets long-term RM&E program needs.

### *2004 Work Plan*

Specific products in 2004 include:

- Identify the data and data system requirements of the FCRPS RM&E program.
- Generate guidelines for implementing a data management RM&E program.
- Identify performance requirements for the data management RM&E program.
- Develop one or more pilot data management projects.

### *2005–2008 Work Plan*

The Action Agencies will continue to work with the region to develop a system for the efficient and effective collection, management and distribution of information relating to fish and related wildlife restoration and management in the Columbia River Basin. The system must meet information needs in relation to the ESA, Northwest Power Act, treaty

trust responsibilities and other relevant requirements. This system will be developed to meet the following objectives:

- Meet monitoring and evaluation and scientific research needs and satisfy identified management, environmental and biological objectives of recovery and management efforts.
- Ensure access to biological data relating to fish and wildlife populations in the Columbia River Basin; attributes of aquatic, terrestrial and marine habitats; and ecological functions and attributes of species and habitats.
- Include data pedigree and metadata and clearly distinguish primary data and derived information.

## RM&E Strategy 6: Regional Coordination

The Action Agencies are working with NOAA Fisheries to implement an RM&E Plan that addresses the NOAA Fisheries BiOp requirements for ESA-listed salmon and steelhead stocks. This RM&E overlaps with other regional programs having their own needs and geographic coverage. The Action Agencies are coordinating the RM&E Plan development and implementation with other federal, state, and tribal programs and will take advantage of the current monitoring data and overlapping monitoring programs. NOAA Fisheries and the Action Agencies are attempting to cooperatively develop the FCRPS RM&E Plan with the intent that it will also complement and be integrated within the other regional monitoring activities to the greatest extent practicable. This coordination will be essential to maximize the amount and quality of RM&E across the region within limited budgets.

The Action Agencies and NOAA Fisheries recognize that the various programs have different goals and objectives and that this will preclude region-wide reliance on any single monitoring program until much broader and comprehensive multi-agency agreements on RM&E can be developed. As these multiple programs are coordinated, they are envisioned to form a comprehensive and integrated network across the Pacific Northwest.

The goal of regional coordination of federal, state, and tribal RM&E requirements and associated programs includes the following objectives:

- Coordinate research methods, data collection and reporting protocols. Recommend ways to standardize these elements.
- Identify opportunities and recommend collaboration or combination of studies to increase learning and statistical power of studies.
- Identify cost-sharing opportunities and agreements.
- Provide a point of contact for integrating TRT recovery planning monitoring requirements with regional monitoring programs.
- Assist with integrating F&W Program objectives, funding prioritization and subbasin planning efforts with other regional RM&E efforts.

### Status Monitoring and Tributary Habitat Action Effectiveness RM&E Coordination

Several multi-agency coordination groups are currently meeting to coordinate regional monitoring programs and strategies. The most prominent of these efforts is the PNAMP. This partnership began over a year ago through coordination of the U.S. Forest Service and Bureau of Land Management Westside Forest Plan monitoring with the states of Oregon, Washington and California. This coordination effort has recently expanded to include the PacFish and InFish (Eastside federal monitoring program), the Action Agencies and NOAA Fisheries RM&E Program, the Council's Fish and Wildlife Program, and participation by the Environmental Protection Agency, USGS, CRITFC, and CBFWA. This group is pursuing further expansion to other regional states and tribes that would be interested in participation. The federal executives for the Northwest Forest Plan, the Federal Caucus, the Council, and state agency executives have acknowledged that the PNAMP is an appropriate group to undertake regional coordination of monitoring programs. The PNAMP has recently agreed to work together to develop a Pacific Northwest Monitoring Coordination Plan. The Action Agencies plan to continue to actively participate and coordinate the 2004–2008 BiOp RM&E plan and projects for status monitoring and habitat action effectiveness research through this regional group.

Another parallel regional monitoring program coordination effort has begun as part of the recently legislated Pacific Coast Salmon Recovery Fund (PCSRF) effectiveness reporting requirements. This group includes participants from Oregon, Washington, California, NOAA Fisheries, the Council, BPA and Reclamation. This group has developed common project implementation reporting metrics to be used in reporting on project funding and results to Congress, Office of Management and Budget and the state governors. The Action Agencies plan to continue to participate in the development of coordinated project tracking and project effectiveness monitoring through this group.

In addition to these above efforts the Action Agencies will be working with NOAA Fisheries, Council staff and CBFWA on implementation of a CBFWA project funded by BPA for collaborative, systemwide monitoring and evaluation.

This work will be integrated with the RM&E Plan, PNAMP coordination, and the PCSRF Reporting coordination. The primary focus of the CBFWA coordination funded under this proposal will be the development of technical products that will feed into and be informed by other regional policy and programmatic forums on RM&E coordination. We anticipate a major step forward in regional coordination as these coordination efforts and the CBFWA project are clarified and integrated over the next several months. As this effort expands, there will be additional efforts to include RM&E efforts associated with the USFWS bull trout recovery planning, the Council's Fish and Wildlife Program, and tribal RM&E programs in this coordination. Direct coordination is envisioned to occur over the next year through the implementation of the RM&E Plan status monitoring and action effectiveness research pilot studies in the John Day, Wenatchee and Upper Salmon subbasins. Key objectives of these pilot projects include working with regional entities at the implementation level to identify how best to integrate and coordinate with other RM&E programs and objectives.

## Hydrosystem RM&E Coordination

Hydrosystem RM&E is primarily being coordinated through the Corp's AFEP and NOAA Fisheries hydrosystem branches. Coordination with AFEP is primarily accomplished by having representatives from the Corps offices (Walla Walla and Portland) as official Hydrosystem RM&E workgroup members. Research planned and funded under AFEP will be scrutinized in the context of priorities and needs of the BiOp RM&E Plan and includes project and program level reviews that include participation by state and tribal fish agencies. Coordination with NOAA Fisheries will be accomplished through official membership on the Hydrosystem RM&E workgroup from the NOAA Fisheries management and research branches. Additional coordination with state and tribal fish agencies is planned over the next few months through the expansion of the RM&E work group participation or through interaction of this group with a hydrosystem subgroup of the CBFWA collaborative, systemwide monitoring and evaluation project.

## Hatchery and Harvest RM&E Coordination

There are no over-arching forums engaged in coordinating RM&E efforts relating to hatcheries and harvest. Hatchery and harvest RM&E activities are implemented by multiple parties, usually state, tribal, and federal fish management agencies, acting either separately or through various multi-party organizations. With respect to hatchery RM&E efforts, some coordination will continue to occur through the Council's Fish and Wildlife Program, in the sense that all projects funded through the program will be subjected to evaluation by the ISRP and CBFWA. Additionally, the Council's Artificial Production Review process, and NOAA Fisheries' HGMP process (per RPA 169), will create opportunities for greater interaction among the relevant parties and, potentially, improved coordination of RM&E efforts relating to artificial production. However, to implement the large-scale experiments that may be required to detect the impacts of various hatchery practices, significant additional regional coordination will be required.

Similarly, RM&E efforts relating to harvest occur in connection with various forums. For example, the Pacific States Marine Fisheries Commission coordinates tagging and some fishery monitoring programs, and acts as a collector and repository of coastal-wide catch data used for harvest management and stock status assessments. The Pacific Salmon Commission, acting through its various technical committees, solicits and selects among research projects proposed and implemented by the states and tribes in furtherance of agreements relating to the Pacific Salmon Treaty, such as the Treaty's abundance-based Chinook management regime. And, the several states and tribes each conduct RM&E programs relating to their respective fishery management needs. Greater coordination and integration between these activities and the RM&E program prescribed by the NOAA Fisheries BiOp will be pursued in implementation of this plan.

## Estuary/Ocean RM&E Coordination

Regional coordination of the estuary/ocean RM&E Plan component is planned to continue and expand in the 2004–2008 implementation planning period. Currently, the Estuary/Ocean Subgroup informs and receives comments and questions during monthly meetings of the LCREP Science Work Group, a broad-based technical body. Coordination on estuary/ocean RM&E will also continue to occur through the CBFWA and ISRP reviews of Council's Fish and Wildlife Program project proposals and through the Corps' AFEP review and planning of research projects. The estuary/ocean workgroup intends to expand coordination to involve state and tribal fisheries managers in workgroup sessions and review of workgroup products. Coordination is essential in the estuary/ocean arena, as elsewhere, due to the myriad ongoing and proposed monitoring efforts by various entities for various purposes.

# 6.0 Coordination Forums


The following is a list of existing forums for Columbia basin fish restoration activities. The Action Agencies will continue to coordinate BiOp implementation with the region through these and other existing processes to the extent possible. We welcome your input and suggestions for improving our outreach and regional coordination efforts for BiOp implementation planning and implementation.

## Banks Lake Study and EIS

The Banks Lake Drawdown Study will examine the effects of an additional five-feet reduction in the surface elevation of the reservoir during the month of August. Banks Lake is already being drafted five feet from full through pumping reductions that result in about 130 thousand acre feet becoming available for flow augmentation. The additional draft would leave it 10 feet from full by the end of August. This would reduce the amount of water pumped into Banks Lake by an additional 130 thousand acre feet that becomes available for flow augmentation in August. Reclamation will prepare an EIS that will describe the potential environmental, cultural, and economic impacts of the proposed action. Implementation of this action may proceed following consideration of the EIS. The EIS is scheduled for completion in time for August 2004 operational decisions.

## Reclamation NEPA Compliance Tributary Subbasin Habitat Improvements

Implementation of Reclamation's tributary subbasin habitat improvements under NOAA Fisheries BiOp Action 149 requires NEPA compliance prior to project implementation. Reclamation completed programmatic NEPA during 2003 for two groups of subbasins—three priority subbasins in Idaho (Lemhi, Upper Salmon, and Little Salmon) and the three priority subbasins in Oregon (Upper John Day, Middle Fork John Day, and North Fork John Day.) The programmatic Environmental Assessments addressed diversion screening and diversion-related migration barrier modifications. Individual projects in those subbasins will be evaluated for site-specific impacts, such as cultural resource evaluations and will be tiered into the programmatic Environmental Assessment. Projects in the Methow, Entiat, and Wenatchee subbasins will continue to be evaluated individually for NEPA compliance. Reclamation is also pursuing programmatic ESA consultations with NOAA Fisheries and the FWS as appropriate. Contact the Bureau of Reclamation for information.

## NOAA Fisheries Regional Implementation Forum

Development of the hydro system portion of the implementation plans is coordinated through the NOAA Fisheries Regional Implementation Forum. The goal of this Forum is to ensure the broadest possible technical and policy input in planning, funding and implementation decisions regarding the operation and configuration of the FCRPS.

Regional Implementation Forum Teams include the Executive Committee; the Implementation Team; the Technical Management Team; the System Configuration Team; and the Water Quality Team. Membership of the Implementation Team is open to senior program and policy level personnel from the states, Tribes and Federal agencies. The other teams and subgroups operating under the Implementation Team's guidance are open to federal, state, and tribal representatives with technical expertise in hydroelectric operations and/or the effects of hydroelectric operations on listed migrating and resident fish. All meetings of the Regional Forum are open to the public. Meeting minutes are distributed available for review on the NOAA Fisheries Northwest Region home page at: www.nwr.noaa.gov/1hydrop/hydroweb/rif.htm.

## Northwest Power and Conservation Council

The Council is an interstate agency formed by the states of Idaho, Montana, Oregon, and Washington and operating pursuant to the Northwest Power Act. The Northwest Power Act calls on BPA to use its funds and other authorities in a manner consistent with the Council's Fish and Wildlife Program. In order to ensure that actions BPA takes to fulfill BiOp responsibilities as further defined in the plan are integrated with actions taken to implement the Council's Fish and Wildlife Program, BPA coordinates selection and implementation of offsite mitigation actions through the Council's processes. The Council's Web site is at www.nwcouncil.org.

**Subbasin Assessment and Planning**–The Action Agencies are working closely with the Council, and with NOAA Fisheries and USFWS, on subbasin assessment and planning. For information go to www.subbasins.org.

**Provincial Reviews**–BPA used the Council's Provincial Review process as the primary vehicle for soliciting project proposals to address offsite BiOp actions. The Provincial Review process allowed all proposals to be evaluated in the context of a comprehensive plan. Provincial project solicitations identified specific BiOp implementation needs in conjunction with broader non-ESA Northwest Power Act priorities. For more information go to www.nwcouncil.org/fw/province/Default.htm

**Targeted Solicitations**–BPA expects to continue to use the Council's Provincial Review process as the preferred and primary vehicle to solicit projects to fulfill BiOp requirements. The Provincial Review process should ensure the best possible integration of ESA implementation with the broader goals of the Northwest Power Act's fish and wildlife goals. Targeted solicitations would only be used on a limited basis. If targeted solicitations/contracts are warranted, BPA will coordinate with the Council to ensure integration with the Council's Fish and Wildlife Program.

**Artificial Production Review and Evaluation (APRE)**–Through the APRE process, the Council reviewed all artificial production facilities and programs in the Columbia River basin. The review included more than 300 programs of anadromous and resident fish programs involving about 130 facilities. Hatchery program information and final recommendations from the APRE process will be coordinated with subbasin planning.

## The Federal Caucus, the Federal Habitat Team, and All-H Implementation

The Action Agencies continue to have representation on the Federal Caucus pursuant to the December 2000 Memorandum of Understanding among Federal Agencies Concerning the Conservation of Threatened and Endangered Fish Species in the Columbia River Basin. Each agency is also represented on the Federal Habitat Team for coordination of federal offsite mitigation actions. Actions taken under this plan will be coordinated with the Federal Caucus. The Federal Caucus Web site is at www.salmonrecovery.gov.

## Lower Columbia River Estuary Partnership

The Action Agencies will continue to coordinate actions in the estuary with the Lower Columbia River Estuary Partnership. More detail on this coordination is described in Section 5.2 Habitat Priorities. The LCREP Web site is at www.lcrep.org.

## Technical Recovery Teams

Information on the NOAA Fisheries Technical Recovery Teams can be found at http://research.nwfsc.noaa.gov/cbd/trt/index.html.

## Research, Monitoring and Evaluation

The various RM&E coordination forums are described in Section 5.6 of this plan. Further information is available on the Web at www.efw.bpa.gov/cgi-bin/FW/Welcome.cgi.
U.S. v. Oregon.

The Action Agencies will coordinate implementation of harvest-related actions as appropriate with relevant parties, such as the U.S. v. Oregon process, and ocean management forums, such as the Pacific Fisheries Management Council and Pacific Salmon Treaty. The Action Agencies are not parties to U.S. v. Oregon and will rely on NOAA Fisheries and USFWS to play an active role in assisting the Action Agencies in the necessary coordination between actions taken under this plan and the U.S. v. Oregon Process.